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ABSTRACT

A study of selected variables which have an effect upon achievement in shorthand dictation is the focus of this report. The relationship between competency in shorthand accuracy and achievement in shorthand dictation, is studied in Part I. Results of three word-list tests of 200 words each, administered to 135 students, indicated that success in shorthand was significantly related to ability to construct accurate shorthand outlines. Part I describes a comparative analysis of the results obtained from the Gregg Shorthand method and an experimental instruction method. The results at the end of 9 months of instruction were in favor of the experimental group, which had a significantly higher dictation rate, and higher shorthand accuracy and transcription scores. An analysis of the effect of selected variables on achievement, discussed in Part III, found that: (1) Student achievement declined significantly when the length of dictation increased from 3 to 5 minutes, (2) Student achievement declined significantly when the transcription was deferred by 1 week, and (3) Students who wrote incorrect shorthand outlines in taking dictation usually did not transcribe correctly. (GR)

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METHODS OF TEACHING SHORTHAND:
A RESEARCH ANALYSIS

Joe M. Pullis

Louisiana Polytechnic Institute

Ruston, Louisiana

1969

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U. S. DEPARTMENT OF
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SUMMARY

SUMMARY

Pullis, Joe M., Methods of Teaching Shorthand: A Research Analysis, United States Department of Health, Education, and Welfare Research Grant Number OEG-7-8-000016-0059-(010), Project Number 8-G-016, 1969, 272 pages, 118 tables, 4 illustrations, bibliography, 18 titles.

Methods of Teaching Shorthand: A Research Analysis is a study of selected variables which have an effect upon achievement in shorthand dictation.

Part One of this study analyzes the relationship between competency in shorthand accuracy and achievement in shorthand dictation. Part Two is a comparative analysis of the results obtained through the use of two different approaches in the teaching of shorthand. Part Three is an analysis of the effect of varying the duration of shorthand dictation upon the student's ability to transcribe and also a study of the relationship between the accuracy of shorthand notes and the correctness of transcripts resulting from non-deferred and deferred transcription.

In studying the relationship between competency in shorthand accuracy and achievement in shorthand dictation, the purposes were to determine the relationship between the student's (a) ability to write accurate shorthand outlines and his achievement in shorthand dictation, (b) ability to write accurate shorthand outlines and his ability to transcribe the outlines, and (c) ability to transcribe isolated shorthand outlines and his achievement in shorthand dictation.

One hundred thirty-five students participated in the study. Three word-list tests of 200 words each, sampled from Silverthorn's business vocabulary word list, were administered to each student. Four unfamiliar, three-minute, non-previewed dictation tests, ranging from 50 to 140 words a minute, were also administered to each student. The student's highest

shorthand accuracy score, transcription score, and dictation rate were recorded. The Product-Moment Correlation Coefficient was used to determine the relationship between (a) shorthand accuracy and shorthand dictation, (b) shorthand accuracy and shorthand transcription, and (c) shorthand transcription and shorthand dictation.

After the population correlation had been obtained, the hypothesis that the population correlation is zero was tested. If the correlation was significant at the 5 per cent level, coefficients of determination were computed.

The shorthand dictation rates were categorized into dictation-rate levels. The means and standard deviations of the shorthand accuracy index and shorthand transcription index were calculated for each dictation-rate level. In order to learn whether at least two of these means had a significant difference between them, an analysis of variance was computed and an F-ratio found.

If it was found from the analysis of variance that there was a significant difference between at least two means, _t_-tests were computed.

From the findings of this study, there seemed to be strong indication that success in shorthand as measured by achievement in shorthand dictation was significantly related to one's ability to construct accurate shorthand outlines.

1. There was a significant positive relationship ($r = .8326$) between the student's ability to write accurate shorthand outlines and his achievement in shorthand dictation.

2. There was a significant positive relationship ($r = .9305$) between the ability of the student to write accurate shorthand outlines and his ability to transcribe the outlines.

3. There was a significant positive relationship (r = .8056) between the ability of the student to transcribe isolated shorthand outlines and his achievement in shorthand dictation.

4. Competency in transcription increased with competency in shorthand accuracy.

Part Two of this research presents the results obtained from contrasting teaching methods. The two approaches were: Approach A, instruction in shorthand utilizing procedures propounded by the authors of Gregg shorthand; and Approach B, instruction in shorthand using procedures recommended by authorities in shorthand methodology which differ significantly from those procedures established by the authors of Gregg shorthand.

Differences in teaching methodology between Approach A, the control classes, and Approach B, the experimental classes, were as follows:

1. In the experimental classes, students were encouraged to write theoretically accurate shorthand outlines. In the control classes, emphasis was placed only upon the student's writing of shorthand outlines which could be correctly transcribed.

2. Weekly theory, or word-list, tests consisting of 25 words taken from the current week's vocabulary study were administered to the experimental classes beginning the sixth week of the fall quarter. No theory tests were given the control classes.

3. The writing of shorthand was introduced with Assignment Six for the experimental classes and with Assignment 19 for the control classes.

4. When practicing familiar dictation, students in the experimental classes were not allowed to follow the dictation in their texts after the second reading and were encouraged to disregard the text earlier if possible. Students in the control classes were allowed to keep their textbooks open at all times while taking familiar dictation.

5. In the experimental classes, writing of graded new-matter dictation began during the fifth week of instruction. No new-matter dictation was given to the control classes until the completion of shorthand theory.

6. Teachers in the experimental classes observed daily the shorthand writing habits of their students by direct observation as students wrote. At no time did the teachers of the control classes observe directly the writing of shorthand by their students.

7. By the fourth week of instruction, students in the experimental classes wrote their homework twice, once from the connected plate material and once from the English transcript. The control classes wrote their homework only once, and this writing was from the connected plate material.

8. In the experimental classes, at least one reading rate was recorded for each student every two weeks. Students in the control classes were never timed on speed of reading shorthand.

9. Once a week during the winter and spring quarters, students in the experimental classes were given practice drills in the reading of "cold notes." No time was spent in reading "cold notes" in the control classes.

In the control and experimental classes, comparisons were made in the following areas at the end of the winter and spring quarters:

1. Comparison between the control and the experimental groups on shorthand dictation achievement.

2. Comparison between the control and the experimental groups on shorthand accuracy.

3. Comparison between the control and the experimental groups on shorthand transcription.

An analysis was also made to determine the relationship between

1. The ability of the student in the control group to write accurate shorthand outlines and his achievement in shorthand dictation and the ability of the student in the experimental group to write accurate shorthand outlines and his achievement in shorthand dictation.

2. The ability of the student in the control group to write accurate shorthand outlines and his ability to transcribe the outlines and the ability of the student in the experimental group to write accurate shorthand outlines and his ability to transcribe the outlines.

3. The ability of the student in the control group to transcribe isolated shorthand outlines and his achievement in shorthand dictation and the ability of the student in the experimental group to transcribe isolated shorthand outlines and his achievement in shorthand dictation.

4. The student's I. Q. in the control group and his (a) ability to write accurate shorthand outlines, (b) ability to transcribe shorthand outlines, and (c) achievement in shorthand dictation and the student's I. Q. in the experimental group and his (a) ability to write accurate shorthand outlines, (b) ability to transcribe shorthand outlines, and (c) achievement in shorthand dictation.

It was found that the students' ability to write accurate shorthand outlines was apparently established by the first six months of shorthand instruction and appreciable increases in shorthand accuracy did not occur during the latter months of the course.

The significant increase in dictation rates from the winter quarter to the spring quarter was apparently related to the student's ability to write faster the shorthand outlines which he did write rather than to an increased ability to write more shorthand outlines accurately. This conclusion should not imply that an increase in dictation rates would not have been enhanced had the students improved significantly in their ability to write accurate shorthand outlines. The implication of this finding appears to be that the degree of mastery of shorthand theory which the student possesses by the end of his theory course establishes limitations upon his achievement in future shorthand courses.

The ability to write shorthand outlines faster obviously increases dictation rates; however, the ability to transcribe accurately shorthand outlines was dependent upon the accuracy with which the student was able to write the outlines. Increasing the students' dictation rates is therefore predicated upon dual factors: increasing the speed at which the student is capable of writing shorthand outlines and increasing the number of accurate shorthand outlines which the student is able to write.

At the completion of nine months of instruction, the following findings were obtained:

1. There was a significant difference between the control and the experimental groups on shorthand dictation achievement, with the experimental group having significantly higher dictation rates.

2. There was a significant difference between the control and the experimental groups on shorthand accuracy, with the experimental group possessing significantly higher shorthand accuracy scores.

3. There was a significant difference between the control and experimental groups on shorthand transcription ability, with the experimental group receiving the highest transcription scores.

There were significant positive relationships between

1. The ability of the student in the control group to write accurate shorthand outlines and his achievement in shorthand dictation and the ability of the student in the experimental group to write accurate shorthand outlines and his achievement in shorthand dictation.

2. The ability of the student in the control group to write accurate shorthand outlines and his ability to transcribe the outlines and the ability of the student in the experimental group to write accurate shorthand outlines and his ability to transcribe the outlines.

3. The ability of the student in the control group to transcribe isolated shorthand outlines and his achievement in shorthand dictation and the ability of the student in the experimental group to transcribe isolated shorthand outlines and his achievement in shorthand dictation.

There was a nonsignificant relationship between the student's I. Q. in the control group and his (a) ability to write accurate shorthand outlines, (b) ability to transcribe shorthand outlines, and (c) achievement in shorthand dictation and the student's I. Q. in the experimental group and his (a) ability to write accurate shorthand outlines, (b) ability to transcribe shorthand outlines, and (c) achievement in shorthand dictation.

While the difference in the coefficients of correlation between I. Q. and achievement in shorthand dictation for the control classes and the experimental classes was not statistically significant, it was large enough that some consideration should be given to additional study in this area. Recognizing that students of varying intellect learn in different manners, it may be that the teaching methodology used by the shorthand teacher has appeal to the shorthand student relative to his intellectual capacities. In this same regard, shorthand systems which reduce the memory load may benefit students of lower intelligence while handicapping students of higher intelligence.

From a study of selected variables analyzed in Part Three of this report, it was found that (1) when the length of dictation increased from three to five minutes, student achievement declined significantly; (2) when the transcription of dictated material was deferred by one week, student achievement declined significantly, and (3) when students wrote incorrect shorthand outlines in taking dictation, the likelihood of the outlines being correctly transcribed declined significantly.

In consideration of the findings obtained in this study, it is apparent that the premises upon which the Gregg authors have based their teaching procedures have not been well founded. Since achievement which students attain in the shorthand class is directly related to the teaching procedures utilized in the classroom, teaching methods which are designed to promote mastery of the shorthand system are recommended rather than those teaching procedures currently propounded by the authors of Gregg shorthand.

PART ONE

PART ONE

THE RELATIONSHIP BETWEEN COMPETENCY IN SHORTHAND ACCURACY AND ACHIEVEMENT IN SHORTHAND DICTATION

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CHAPTER I

SHORTHAND THEORY: A CONTROVERSIAL ISSUE

Until 1935 most shorthand teachers encouraged their students to write shorthand outlines according to the rules of the system. In 1935 Leslie introduced an entirely new concept in building shorthand skill. Leslie contended that insistence upon accurate outlines created a mental block in speed development and that the high degree of accuracy which teachers had formerly demanded of their students actually interfered with the building of shorthand skill.

In commenting on shorthand accuracy in relation to teaching methodology, Leslie wrote:

> The most important single objective of shorthand learning for the prospective stenographer is the ability to construct rapidly a legible shorthand outline for any word in the English language. The stenographer and the shorthand reporter are not concerned with theoretical accuracy. They are interested in the rapid construction of legible outlines. Emphasis on theoretical correctness serves only to lessen the likelihood that the outline will be constructed with sufficient speed to be of any practical value; it seldom has any effect on legibility.
>
> The teacher should have the ability to construct outlines that are theoretically correct in accordance with the textbooks of the shorthand system. It is not important that the stenographer have this ability, and any attempt to force the stenographic learner to acquire the ability will hamper the learner's progress toward stenographic skill.[1]

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[1] Louis A. Leslie, Methods of Teaching Gregg Shorthand (New York, 1950), p. 121.

Leslie's ideas were widely publicized and generally accepted by shorthand teachers throughout the country. In the past few years, however, the validity of Leslie's statements has been questioned.

After analyzing research findings and thoughtas expressed in professional literature pertaining to shorthand and transcription, Frink states:

> There is a belief on the part of many teachers and business educators that greater emphasis should be given to teaching of theory, not only the brief forms, but also the application of the principles of writing; that is, the writing of shorthand according to the rules.[2]

In discussing Leslie's philosophy regarding shorthand accuracy, Lamb comments:

> Leslie believes that rules are important only to teachers of shorthand, and that time spent in training stenographers should be devoted to the reading, writing, and transcription of shorthand. The thought here seems to be that if students have sufficient practice in applying the rules of word-building, they will automatically apply them in writing unfamiliar words, or at least they get something down that they will be able to read back. Many teachers would disagree with Leslie on this point.
>
> In the opinion of some teachers, the important area of word-building is left too much to chance and individual resourcefulness. We can be sure that even students who have automatized a wide vocabulary of words through extensive reading and writing of shorthand will encounter some unfamiliar words that must be written under pressure of time.[3]

Presenting his point of view concerning the construction of unfamiliar words, Leslie states:

> They /the students/ seem to write "by eye" in the same fashion that many pianists play "by ear." The mental

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[2] Inez Frink, "A Comprehensive Analysis and Synthesis of Research Pertaining to Shorthand and Transcription," unpublished doctoral dissertation, School of Education, Indiana University, Bloomington, Indiana, 1962, p. 149.

[3] Marion M. Lamb, Your First Year of Teaching Shorthand and Transcription (Dallas, 1950), p. 22, 29.

> process may be something like that by which we sometimes test a doubtful construction in English. If we don't happen to know the grammatical rule governing the construction, we read the sentence aloud, and in that way can very often decide which is the correct construction--because it "sounds right."[4]

Lamb, however, is not in accord with this viewpoint and comments:

> These are statements to question. Pianists who play by ear are talented, but if they can play only by ear and cannot read notes, they are handicapped by their lack of musicianship. They can play only what they have heard a number of times, and in all likelihood they will not be entirely accurate in reproducing what they have heard. Furthermore, men and women who choose the grammatical construction that "sounds right" often choose the wrong construction, and unfortunately the choice "sounds wrong" to those who know the rules. Likewise, students cannot count on their ability to write unfamiliar material "by eye" so that it can be transcribed accurately.[5]

Liles also raises some of these same questions and seems to agree with Lamb when he says:

> If the theory of any shorthand system is scientifically determined, it certainly should be a more effective system from the standpoint of readability, speed, and ease of mastery than would be one concocted on the spur of the moment by a student.[6]

Lesser believes that weak students in shorthand are those who have not mastered the theory of the shorthand system.

> Generally, the "weak students" in shorthand have never adequately learned the theory of the shorthand system so that they can automatize their responses. It is unfortunate that too many of the students' shorthand notes reveal that their knowledge of the theory of shorthand is far short of what it should be.[7]

---

[4] Louis A. Leslie, Gregg Shorthand, Teacher's Handbook (New York, 1936), p. 43, as quoted by Marion M. Lamb, *ibid*., p. 30.

[5] Lamb, *op*. *cit*., p. 30.

[6] Parker Liles, "Issues in Teaching Shorthand," Balance Sheet, XLV (October, 1963), 52-57.

[7] Irvin H. Lesser, "Helping Weak Students in Second Semester Shorthand," Journal of Business Education, XXXVIII(December, 1963), 111-112.

In agreeing, Condon states:

> The more complete the understanding of theory, the greater facility the student will bring to dictation, to improving shorthand outlines, and transcribing shorthand notes. . . . Although memorization of rules is not suggested, there is some evidence to suggest that the study of the principles of shorthand theory should receive greater emphasis.[8]

While no shorthand authority advocates rote memorization nor verbalization of rules, many authorities are recommending that greater emphasis be given the development of shorthand vocabulary. Teachers who feel there is a significant relationship between competency in shorthand accuracy and achievement in shorthand dictation will utilize teaching methods such as vocabulary drills and word-list tests which are designed to systematically build a shorthand vocabulary that will be written in accordance with the shorthand system. Teachers who feel that emphasis on shorthand accuracy is of no value or is detrimental to students will abstain from such an approach and will not be concerned with the accuracy of the student's construction of shorthand outlines.

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[8] Arnold Condon, "Principles for the Development of Theory and the Building of Writing Skills in First-Year Shorthand," Secretarial Education with a Future, The American Business Education Yearbook of The Eastern Business Teachers Association and The National Business Teachers Association (Somerville, New Jersey, 1962), pp. 134-136.

CHAPTER II

THE PROBLEM

> Many now prevalent aspects of shorthand methodology have been taken for granted by beginning teachers simply because they have read about them in teachers' manuals or articles in professional literature. . . . Unfortunately, many of the 'accepted' methods propounded to the teaching profession are unilateral in origin and have no scientific basis.[1]

Statement of the Problem

This problem was a study of the relationship between competency in shorthand accuracy and achievement in shorthand dictation.

Significance of the Study

Many aspects of teaching methodology have been based upon the assumption that students do not benefit appreciably from high-level competency in shorthand theory. Since major differences of opinion prevail as to whether the student's ability to write accurate shorthand outlines is significantly related to achievement in shorthand dictation, a definite need exists for empirical evidence concerning the relationship between competency in shorthand accuracy and achievement in shorthand dictation.

Purposes of the Study

The primary purpose of this investigation was to gain insight into the relationship between the student's ability to write accurate shorthand outlines[2] and his achievement in shorthand dictation. In order to gain a better understanding of the relationship between certain other variables which might affect achievement in shorthand dictation, an analysis was made to determine:

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[1] Parker Liles, "Issues in Teaching Shorthand," Balance Sheet, XLV (October, 1963), p. 52.

1. The relationship between the ability of the student to write accurate shorthand outlines and his ability to transcribe the outlines.

2. The relationship between the ability of the student to transcribe shorthand outlines and his achievement in shorthand dictation.

Hypotheses

The basic hypothesis of this study was that there would be a significant positive relationship between the student's ability to write accurate shorthand outlines and his achievement in shorthand dictation. This study included the following sub-hypotheses:

1. There will be a significant positive relationship between the ability of the student to write accurate shorthand outlines and his ability to transcribe the outlines.

2. There will be a significant positive relationship between the ability of the student to transcribe shorthand outlines and his achievement in shorthand dictation.

Definition of Terms

1. Shorthand Theory. As used in this study, shorthand theory refers to the correct application of rules or principles for writing rather than the rote memorization of such rules.

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[2] In this study, an accurate shorthand outline is one which is in accordance with the outlines in the Gregg Shorthand Dictionary.

2. Shorthand Word-List Test. Each shorthand word-list test consists of 200 words sampled from Silverthorn's High Frequency Business Vocabulary Word List.[3] These 200 words were dictated to the students at the rate of one word every four seconds. After the 200 words were dictated, the students transcribed the list.

3. Shorthand Accuracy Index. The student's shorthand accuracy index represents the highest number of shorthand outlines which he was able to write correctly on any one of the three word-list tests.

4. Shorthand Transcription Index. The student's shorthand transcription index represents the highest number of shorthand outlines which he was able to transcribe correctly on any one of the three shorthand word-list tests.

5. Unfamiliar, Non-Previewed Dictation. Unfamiliar, non-previewed dictation refers to dictation material taken from copy with which the students were not familiar. No words contained in the copy were written for the students either before or after the dictation.

6. Shorthand Dictation Achievement. The highest speed at which a student was able to take a three-minute, unfamiliar, non-previewed dictation and transcribe with no more than three per cent shorthand transcription error represents his shorthand dictation achievement.

7. Shorthand Transcription Error. An error which is attributable to the incorrect transcription of a shorthand outline.

8. Non-shorthand Transcription Error. An error in spelling, punctuation, or grammar.

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[3] J. E. Silverthorn, High Frequency Business Vocabulary Word List (Dallas, 1958).

Procedures for Collecting and Treating Data

One hundred thirty-five college students enrolled in four levels of shorthand instruction participated in this study. The four levels of shorthand instruction were Principles of Shorthand, First Course; Principles of Shorthand, Second Course; Intermediate Shorthand--Transcription, First Course; and Intermediate Shorthand--Transcription, Second Course.

Three weekly word-list tests of 200 words each, sampled from Silverthorn's High Frequency Business Vocabulary Word List, were administered to each class. Silverthorn's High Frequency Business Vocabulary Word List consists of 4,950 of the most frequently used words in business communications arranged according to frequency of occurrence. For each test, 40 words were selected at random from every 1,000 words in Silverthorn's list, yielding a total of 200 words.

Each test was prerecorded on tape in order to maintain a consistency of dictation for each class. After the test had been administered, the students were asked to transcribe their outlines. Both the shorthand outlines and the transcription were graded. The number of shorthand outlines which the student accurately wrote constituted his shorthand accuracy score. The number of shorthand outlines which the student transcribed correctly constituted his shorthand transcription score.

A series of four weekly unfamiliar, three-minute, non-previewed dictation tests was given to each class. The dictation material was taken from Progressive Dictation with Previews[4] by Zoubek. The dictation was prerecorded on tape at rates ranging from 50 to 140 words a minute.

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[4] Charles E. Zoubek, Progressive Dictation with Previews, (Dallas, 1958).

Students were asked to transcribe the highest rate which they could transcribe with no more than three per cent error.[5] The highest speed at which a student could transcribe with 97 per cent accuracy constituted his dictation rate.

The student's highest shorthand accuracy score, transcription score, and dictation rate were recorded. The Product-Moment Correlation Coefficient was used to determine the relationship between (a) shorthand accuracy and shorthand dictation, (b) shorthand accuracy and shorthand transcription, and (c) shorthand transcription and shorthand dictation.

After the population correlation had been obtained, the hypothesis that the population correlation is zero was tested. If the correlation was significant at the 5 per cent level, coefficients of determination were computed.

The shorthand dictation rates were categorized into dictation-rate levels. The means and standard deviations of the shorthand accuracy index and shorthand transcription index were calculated for each dictation-rate level. In order to learn whether at least two of these means had a significant difference between them, an analysis of variance was computed and an F ratio found.

If it was found from the analysis of variance that there was a significant difference between at least two means, t-tests were computed.

Plan of the Study

The remaining chapters of Part One include Chapter III, Presentation and Analysis of Data; and Chapter IV, Summary, Findings, Conclusions and Implications.

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[5] Non-shorthand transcription errors such as spelling, grammar, and punctuation, with the exception of dictated paragraphs, were not considered in the error limit, as the primary cause of this type of error is not considered to be attributable to shorthand outlines.

CHAPTER III

PRESENTATION AND ANALYSIS OF DATA

Introduction

Chapter III presents the relationship between shorthand accuracy and shorthand dictation, shorthand transcription and shorthand accuracy, and shorthand transcription and shorthand dictation. Coefficients of determination are presented for all significant positive correlations.

In order that one might see the relationship in shorthand accuracy and shorthand transcription between all dictation-rate levels found in this study, _t_-ratios are presented for each of these variables where the analysis of variance indicates that significant differences do exist within a given variable at two or more dictation-rate levels.

After the research data have been presented and analyzed, a chapter summary is provided at the end of Chapter III.

Relationship Between Shorthand Accuracy and Shorthand Dictation

Table I presents statistical measures relating to shorthand accuracy and shorthand dictation.

TABLE I

STATISTICAL MEASURES RELATING TO SHORTHAND ACCURACY AND SHORTHAND DICTATION

Related Variables	Mean	Standard Deviation	Coefficient of Correlation	Coefficient of Determination
Shorthand Accuracy Index	141.8888	32.7291	.8326	.6932
Shorthand Dictation Rate	95.5555	20.6798		

The value of the coefficient of correlation between shorthand accuracy and shorthand dictation was .8326, which was significant at the .05 level. The coefficient of determination indicated that approximately 69 per cent of the variation in shorthand dictation achievement was explained by variation in shorthand accuracy.

The shorthand dictation rates listed according to the shorthand accuracy indices and the shorthand accuracy indices listed according to the shorthand dictation rates are presented in Tables LVII and LVIII.

Relationship Between Shorthand Accuracy and Shorthand Transcription

Table II presents statistical measures relating to shorthand accuracy and shorthand transcription.

TABLE II

STATISTICAL MEASURES RELATING TO SHORTHAND ACCURACY AND SHORTHAND TRANSCRIPTION

Related Variables	Mean	Standard Deviation	Coefficient of Correlation	Coefficient of Determination
Shorthand Accuracy Index	141.8888	32.7291	.9305	.8658
Shorthand Transcription Index	166.5407	28.9980		

The value of the coefficient of correlation between shorthand accuracy and shorthand transcription was .9305, which was significant at the .05 level. The coefficient of determination indicated that approximately 87 per cent of the variation in shorthand transcription was explained by variation in shorthand accuracy.

The shorthand transcription indices listed according to shorthand accuracy indices and the shorthand accuracy indices listed according to the shorthand transcription indices are presented in Tables LIX and LX.

Relationship Between Shorthand Transcription and Shorthand Dictation

Table III presents statistical measures relating to shorthand transcription and shorthand dictation.

TABLE III

STATISTICAL MEASURES RELATING TO SHORTHAND TRANSCRIPTION AND SHORTHAND DICTATION

Related Variables	Mean	Standard Deviation	Coefficient of Correlation	Coefficient of Determination
Shorthand Transcription Index	166.5407	28.9980	.8056	.6490
Shorthand Dictation Rate	95.5555	20.6798		

The value of the coefficient of correlation between shorthand transcription and shorthand dictation was .8056, which was significant at the .05 level. The coefficient of determination indicated that approximately 65 per cent of the variation in shorthand dictation achievement was explained by variation in shorthand transcription ability. It should be recalled that approximately 87 per cent of the students' shorthand transcription ability was explained by variation in shorthand accuracy.

The shorthand dictation rates listed according to the shorthand transcription indices and the shorthand transcription indices listed according to the shorthand dictation rates are presented in Tables LXI and LXII.

Relationship Between Shorthand Accuracy and Shorthand Dictation at Nine Dictation-Rate Levels

Statistical measures relating to shorthand accuracy scores of nine groups of students classified according to shorthand dictation rates are presented in Table IV.

TABLE IV

STATISTICAL MEASURES RELATING TO SHORTHAND ACCURACY SCORES OF NINE GROUPS OF STUDENTS CLASSIFIED ACCORDING TO SHORTHAND DICTATION RATE

Shorthand Dictation-Rate Levels	Statistical Measures of Shorthand Accuracy Scores		
	Mean	S. D.	N.
130	178.0	5.7	5
120	163.2	8.3	9
110	160.2	15.3	45
100	152.1	16.5	24
90	137.8	20.1	18
80	140.4	12.1	7
70	109.9	13.7	9
60	99.2	19.2	11
50	55.6	19.9	7

An analysis of variance was computed to determine whether at least two of the shorthand accuracy means had a significant difference between them. An F-ratio of 50.1103, significant at the .001 level, was found, indicating that at least two of the shorthand accuracy means were significantly different (Table V).

TABLE V

ANALYSIS OF VARIANCE OF SHORTHAND ACCURACY SCORES OF NINE SHORTHAND DICTATION-RATE LEVELS

Source of Variation	d.f.	Mean Square	F
Between groups	8	13753.5750	50.1103
Within groups	126	274.4658	

Whether there were significant differences between more than two of the mean accuracy scores, and which means had significant differences, had to be determined from _t_-tests (Table VI).

TABLE VI

THE _t_-RATIOS OF SHORTHAND ACCURACY SCORES OF NINE SHORTHAND DICTATION-RATE LEVELS

Shorthand Dictation-Rate Level	Shorthand Dictation-Rate Level							
	120	110	100	90	80	70	60	50
130	1.60	2.27*	3.18*	4.79*	3.87*	7.37*	8.82*	12.62*
120		.49	1.71	3.75*	2.73*	6.83*	8.60*	12.89*
110			1.94	4.84*	2.94*	8.32*	10.96*	15.55*
100				2.76*	1.64	6.54*	8.78*	13.57*
90					-.34	4.14*	6.10*	11.15*
80						3.66*	5.15*	9.58*
70							1.44*	6.51*
60								5.44*

*Significant at the .05 level.

In order to chart the accuracy index scores of the 135 students, the class mean was calculated for each dictation-rate level. As the shorthand dictation rate increased from 50 to 130 words a minute, the shorthand accuracy mean for each rate also increased with the exception of the 90 word-a-minute rate (Figure 1).

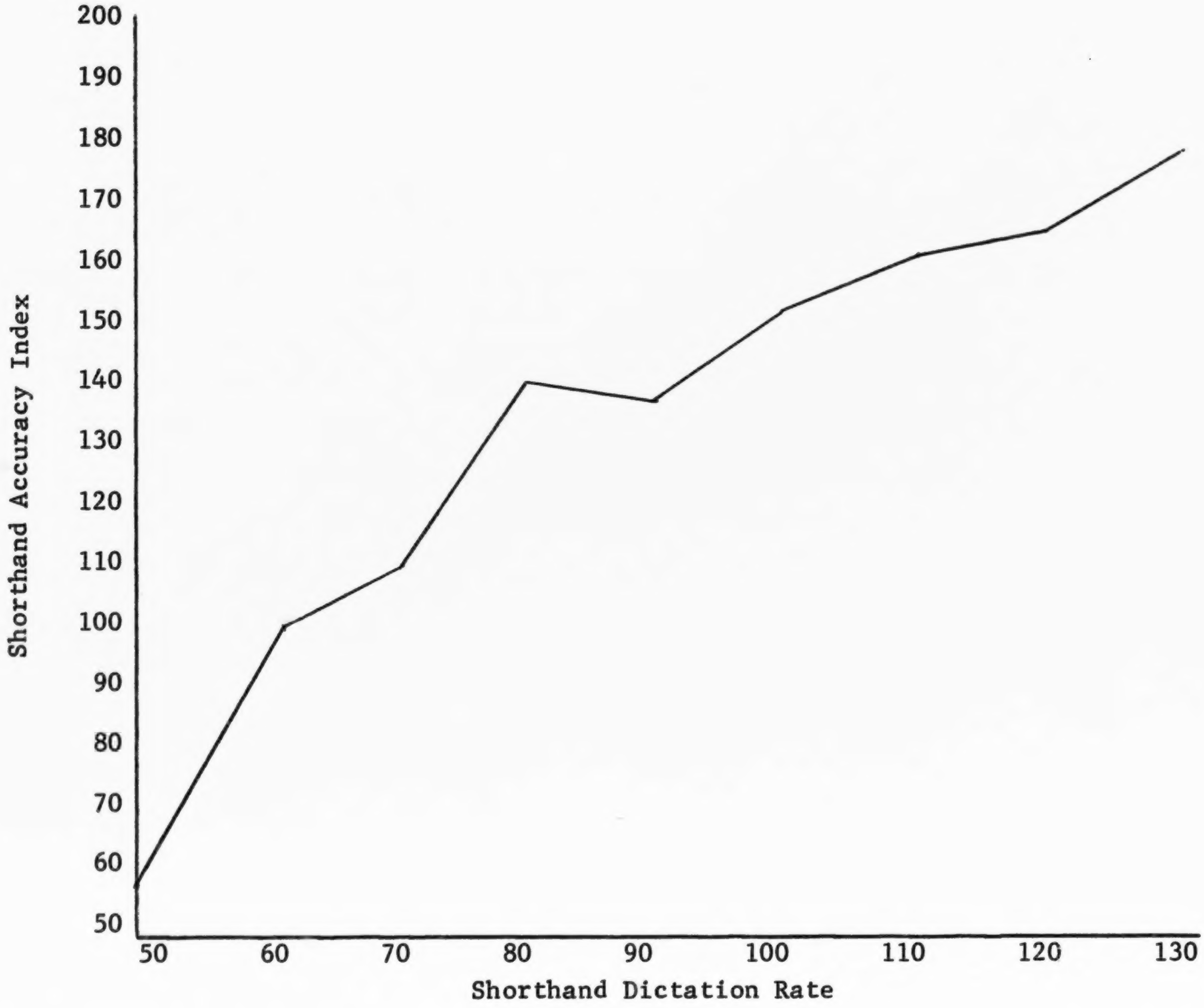

Fig. 1--Mean shorthand accuracy indexes of nine groups of students classified according to shorthand dictation rate.

Relationship Between Shorthand Transcription and Shorthand Dictation at Nine Dictation-Rate Levels

Statistical measures relating to shorthand transcription scores of nine groups of students classified according to shorthand dictation rates are presented in Table VII.

TABLE VII

STATISTICAL MEASURES RELATING TO SHORTHAND TRANSCRIPTION MEANS OF NINE GROUPS OF STUDENTS CLASSIFIED ACCORDING TO SHORTHAND DICTATION RATE

Shorthand Dictation-Rate Levels	Statistical Measures of Shorthand Transcription Scores		
	Mean	S. D.	N.
130	191.6	3.4	5
120	181.6	9.5	9
110	182.3	10.5	45
100	174.5	13.3	24
90	167.4	15.0	18
80	172.0	15.7	7
70	147.8	12.3	9
60	123.3	20.0	11
50	85.1	23.0	7

An analysis of variance was computed to determine whether at least two of the shorthand transcription means had a significant difference between them. An F-ratio of 54.9461, significant at the .001 level, was found, indicating that at least two of the shorthand transcription means were significantly different (Table VIII).

TABLE VIII

ANALYSIS OF VARIANCE OF SHORTHAND TRANSCRIPTION SCORES OF NINE SHORTHAND DICTATION-RATE LEVELS

Source of Variation	d.f.	Mean Square	F
Between groups	8	11028.6500	54.9461
Within groups	126	200.7174	

Whether there were significant differences between more than two of the mean transcription scores, and which means had significant differences, had to be determined from t-tests (Table IX).

TABLE IX

THE t-RATIOS OF SHORTHAND TRANSCRIPTION SCORES OF NINE SHORTHAND DICTATION-RATE LEVELS

Shorthand Dictation-Rate Level	Shorthand Dictation-Rate Level							
	120	110	100	90	80	70	60	50
130	1.27	1.39	2.46*	3.27*	2.36*	5.55*	8.94*	12.83*
120		-.15	1.28	2.44*	1.34	5.05*	9.15*	13.50*
110			2.19*	3.76*	1.79	6.68*	12.39*	16.88*
100				1.59	.40	4.82*	9.92*	14.68*
90					-.72	3.40*	8.15*	13.47*
80						3.39*	7.11*	11.47*
70							3.85*	8.77*
60								5.57*

*Significant at the .05 level.

In order to chart the transcription index scores of the 135 students, the class mean was calculated for each dictation-rate level. As the shorthand dictation rate increased from 50 to 130 words a minute, the shorthand transcription mean for each rate also increased with the exception of the 90 and 120 word-a-minute rates (Figure 2).

Figure 3 is presented in order that one may see the dual relationship between shorthand accuracy and transcription and shorthand dictation.

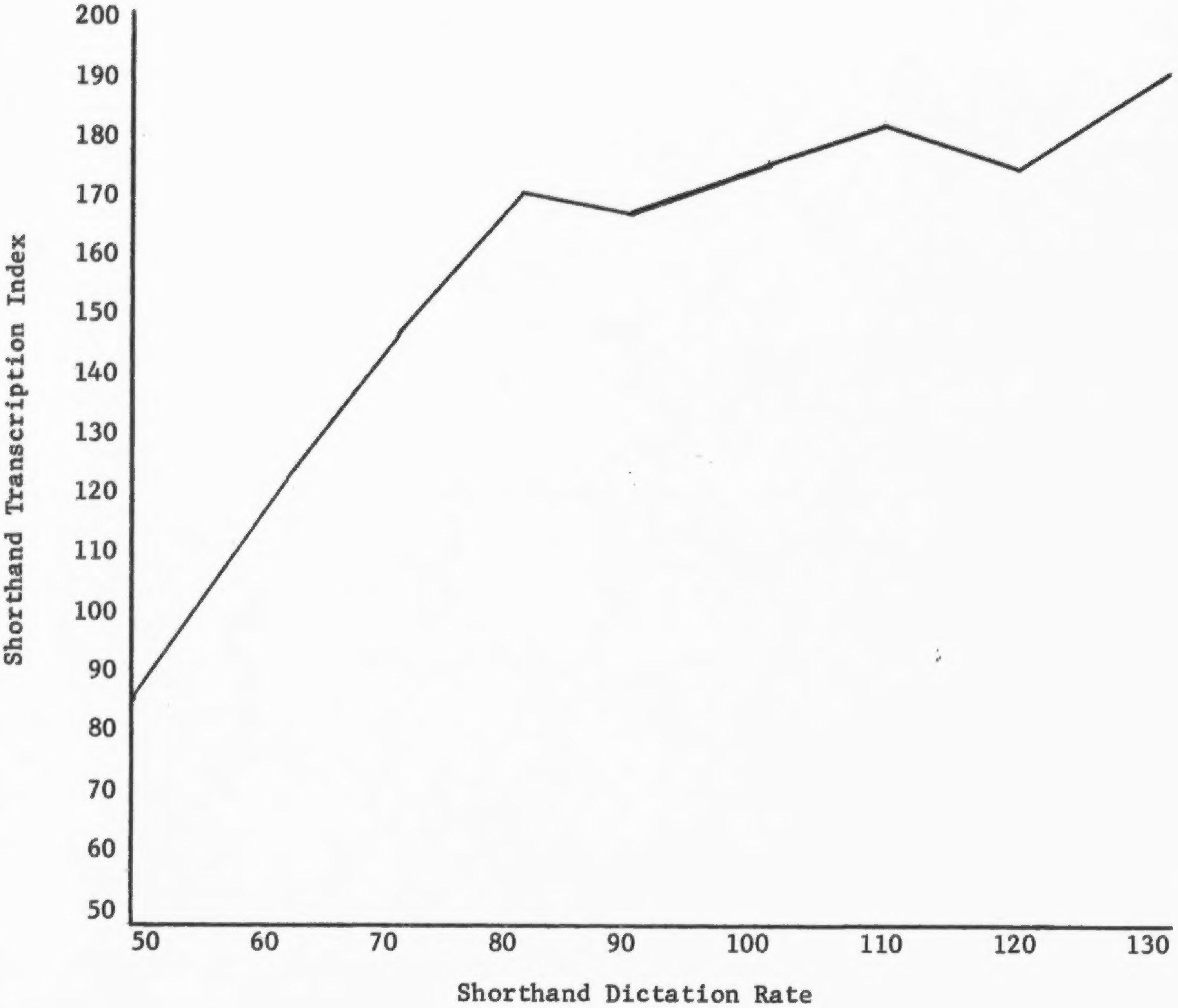

Fig. 2--Mean shorthand transcription indexes of nine groups of students classified according to shorthand dictation rate.

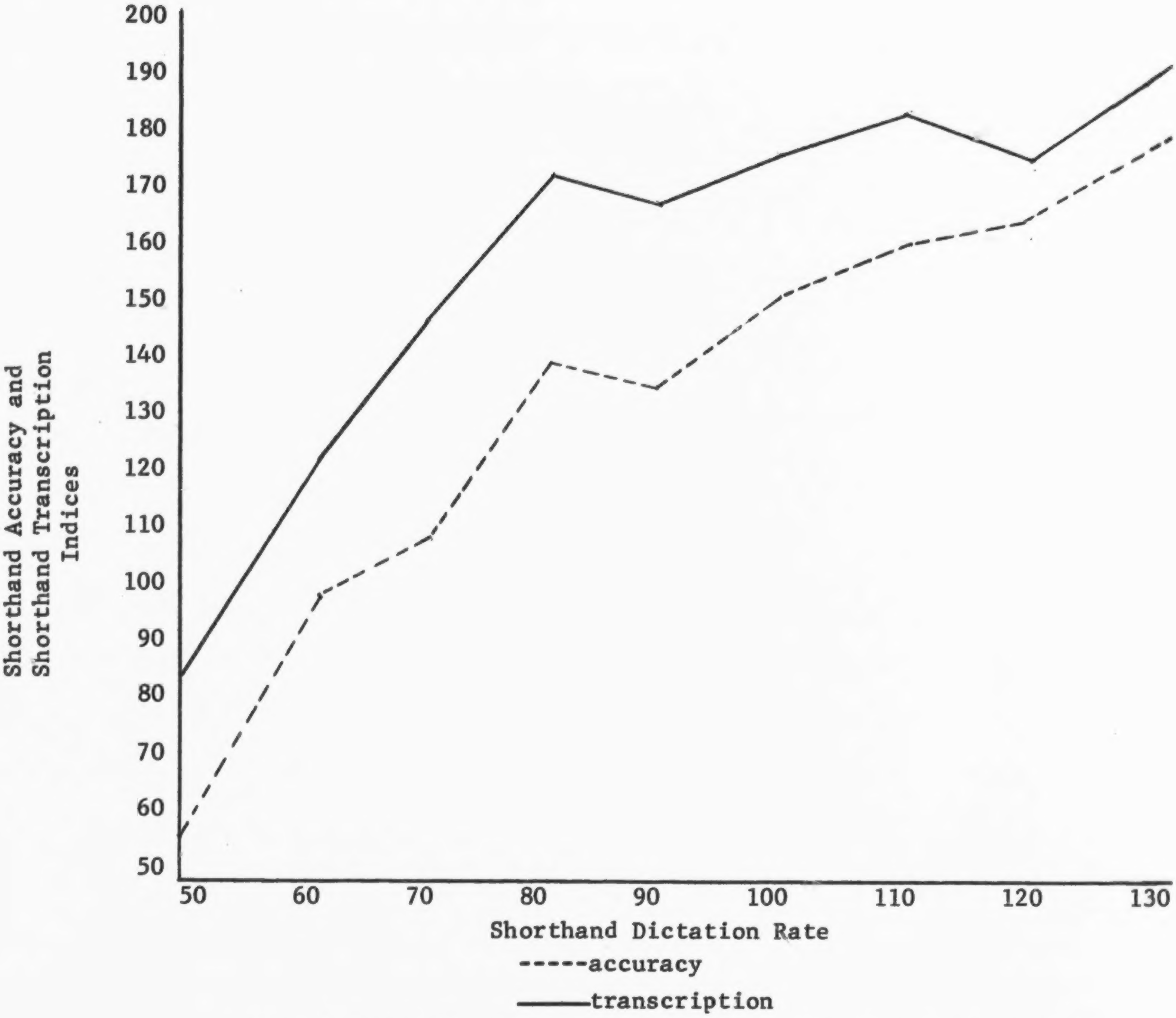

Fig. 3--Mean shorthand accuracy indexes and mean shorthand transcription indexes of nine groups of students classified according to shorthand dictation rate.

It can be seen that as shorthand accuracy increased, shorthand transcription increased. As the shorthand dictation rate increased from 50 to 130 words a minute, the shorthand accuracy index and the shorthand transcription index also increased.

Chapter Summary

Shorthand accuracy contributed more than any other factor in the student's ability to transcribe the outlines which he had written (Table II). In fact, the coefficient of determination indicated that better than 86 per cent of the variation in shorthand transcription was explained by variation in shorthand accuracy. It is interesting to note that there was actually a higher correlation between shorthand accuracy and shorthand transcription achievement (Table II) than between shorthand transcription and shorthand dictation achievement (Table III). There was also a higher correlation between shorthand accuracy and shorthand dictation achievement (Table I) than between shorthand transcription and shorthand dictation achievement (Table III). Though the ability to read outlines was important in shorthand dictation achievement, it was the ability to construct accurate shorthand outlines which enabled the student to read the outlines he had written.

Significant differences did exist between shorthand accuracy means at the following dictation-rate levels: 130 and 110; 130 and 100; 130 and 90; 130 and 80; 130 and 70; 130 and 60; 130 and 50; 120 and 90; 120 and 80; 120 and 70; 120 and 60; 120 and 50; 110 and 90; 110 and 80; 110 and 70; 110 and 60; 110 and 50; 100 and 90; 100 and 70; 100 and 60; 100 and 50; 90 and 70; 90 and 60; 90 and 50; 80 and 70; 80 and 60; 80 and 50; 70 and 60; 70 and 50; and 60 and 50 (Table IX). Achievement in shorthand dictation increased with competency in shorthand accuracy at every speed level with exception of the 90 level. The coefficient of determination between shorthand accuracy and shorthand dictation achievement indicated that approximately 69 per cent of the variation in shorthand dictation achievement was explained by variation in shorthand accuracy (Table I).

Significant differences were also found between shorthand transcription means at the following dictation-rate levels: 130 and 100; 130 and 90; 130 and 80; 130 and 70; 130 and 60; 130 and 50; 120 and 90; 120 and 80; 120 and 70; 120 and 60; 120 and 50; 110 and 100; 110 and 90; 110 and 80; 110 and 70; 110 and 60; 110 and 50; 100 and 70; 100 and 60; 100 and 50; 90 and 70; 90 and 60; 90 and 50; 80 and 70; 80 and 60; 80 and 50; 70 and 60; 70 and 50; and 60 and 50 (Table XII). Achievement in shorthand dictation increased with competency in shorthand transcription at every speed level with exception of the 120 and 90 levels; and competency in shorthand transcription, in turn, was dependent upon competency in shorthand accuracy (Table II). The coefficient of correlation between shorthand transcription and shorthand accuracy was .9305 (Table II). The coefficient of correlation between achievement in shorthand dictation and shorthand accuracy was .8326 (Table I).

Success in shorthand, as measured by achievement in shorthand dictation, was significantly related to one's ability to construct accurate shorthand outlines.

Each of the research hypotheses made in this study could be retained:

1. There was a significant positive relationship (r = .8326) between the student's ability to write accurate shorthand outlines and his achievement in shorthand dictation.

2. There was a significant positive relationship (r = .9305) between the ability of the student to write accurate shorthand outlines and his ability to transcribe the outlines.

3. There was a significant positive relationship (r = .8056) between the ability of the student to transcribe isolated shorthand outlines and his achievement in shorthand dictation.

CHAPTER IV

SUMMARY, FINDINGS, CONCLUSIONS, AND IMPLICATIONS

Summary

This problem was a study of the relationship between competency in shorthand accuracy and achievement in shorthand dictation.

The purposes of this study were to determine

1. The relationship between the student's ability to write accurate shorthand outlines and his achievement in shorthand dictation.

2. The relationship between the ability of the student to write accurate shorthand outlines and his ability to transcribe the outlines.

3. The relationship between the ability of the student to transcribe shorthand outlines and his achievement in shorthand dictation.

The basic hypotheses of this study were

1. There will be a significant positive relationship between the student's ability to write accurate shorthand outlines and his achievement in shorthand dictation.

2. There will be a significant positive relationship between the ability of the student to write accurate shorthand outlines and his ability to transcribe the outlines.

3. There will be a significant positive relationship between the ability of the student to transcribe shorthand outlines and his achievement in shorthand dictation.

One hundred thirty-five college students enrolled in four levels of shorthand instruction participated in the study.

Three weekly word-list tests of 200 words each, sampled from Silverthorn's High Frequency Business Vocabulary Word List, were administered to each class. Each test was prerecorded on tape in order to maintain a consistency of dictation for each class. After the test had been administered, the students were asked to transcribe their outlines. Both the shorthand outlines and the transcription were graded. The number of shorthand outlines which the student accurately wrote constituted his shorthand accuracy score. The number of shorthand outlines which the student transcribed correctly constituted his shorthand transcription score.

A series of four weekly unfamiliar, three-minute, non-previewed dictation tests was given to each class. The dictation was prerecorded on tape at rates ranging from 50 to 140 words a minute. Students were asked to transcribe the highest rate which they could transcribe with no more than three per cent shorthand transcription error. The highest speed at which a student could transcribe with 97 per cent accuracy constituted his dictation rate.

The student's highest shorthand accuracy score, transcription score, and dictation rate were recorded. The Product-Moment Correlation Coefficient was used to determine the relationship between (a) shorthand accuracy and shorthand dictation, (b) shorthand accuracy and shorthand transcription, and (c) shorthand transcription and shorthand dictation.

After the population correlation had been obtained, the hypothesis that the population correlation is zero was tested. If the correlation was significant at the 5 per cent level, coefficients of determination were computed.

The shorthand dictation rates were categorized into dictation-rate levels. The means and standard deviations of the shorthand accuracy index and shorthand transcription index were calculated for each dictation-rate level. In order to learn whether at least two of these means had a significant difference between them, an analysis of variance was computed and an F-ratio found.

If it was found from the analysis of variance that there was a significant difference between at least two means, t-tests were computed.

Findings

1. There was a significant positive relationship (r = .8326) between the student's ability to write accurate shorthand outlines and his achievement in shorthand dictation.

2. The coefficients of determination indicated that approximately 69 per cent of the variation in shorthand dictation achievement was explained by variation in shorthand accuracy.

3. There was a significant positive relationship (r = .9305) between the ability of the student to write accurate shorthand outlines and his ability to transcribe the outlines.

4. The coefficient of determination indicated that approximately 87 per cent of the variation in shorthand transcription was explained by variation in shorthand accuracy.

5. There was a significant positive relationship (r = .8056) between the ability of the student to transcribe isolated shorthand outlines and his achievement in shorthand dictation.

6. The coefficient of determination indicated that approximately 65 per cent of the achievement in shorthand dictation was directly associated with the student's ability to transcribe isolated shorthand outlines. Approximately 87 per cent of the student's ability to transcribe isolated shorthand outlines was directly associated with competency in shorthand accuracy.

7. Significant differences existed between shorthand accuracy means at the following dictation-rate levels: 130 and 110; 130 and 100; 130 and 90; 130 and 80; 130 and 70; 130 and 60; 130 and 50; 120 and 90; 120 and 80; 120 and 70; 120 and 60; 120 and 50; 110 and 90; 110 and 80; 110 and 70; 110 and 60; 110 and 50; 100 and 90; 100 and 70; 100 and 60; 100 and 50; 90 and 70; 90 and 60; 90 and 50; 80 and 70; 80 and 60; 80 and 50; 70 and 60; 70 and 50; and 60 and 50.

8. Achievement in shorthand dictation increased with competency in shorthand accuracy at every speed level with exception of the 90 level.

9. Significant differences existed between shorthand transcription means at the following dictation-rate levels: 130 and 100; 130 and 90; 130 and 80; 130 and 70; 130 and 60; 130 and 50; 120 and 90; 120 and 80; 120 and 70; 120 and 60; 120 and 50; 110 and 100; 110 and 90; 110 and 80; 110 and 70; 110 and 60; 110 and 50; 100 and 70; 100 and 60; 100 and 50; 90 and 70; 90 and 60; 90 and 50; 80 and 70; 80 and 60; 80 and 50; 70 and 60; 70 and 50; and 60 and 50.

10. Achievement in shorthand dictation increased with competency in shorthand transcription at every speed level with exception of the 120 and 90 levels.

11. Competency in shorthand transcription increased with competency in shorthand accuracy.

Conclusions

Each of the research hypotheses was accepted.

1. Shorthand dictation achievement is significantly related to the student's ability to construct accurate shorthand outlines.

2. Shorthand transcription ability is significantly related to the student's ability to construct accurate shorthand outlines.

3. Shorthand dictation achievement is significantly related to shorthand transcription ability.

4. Though shorthand transcription ability is significantly related to achievement in shorthand dictation, it is the student's ability to construct accurate shorthand outlines which enables him to transcribe the outlines which he has written.

Implications of the Study and Suggestions for Further Research

Additional study relating the student's ability to write accurate shorthand outlines with his achievement in shorthand dictation should be made. If evidence supports the finding that there is a significant positive correlation between the student's ability to write accurate shorthand outlines and his achievement in shorthand dictation, then shorthand teaching methodology and procedures used in the classroom should place emphasis upon the development of the student's ability to write accurate shorthand outlines. Practices in teaching methodology which have been based upon the assumption that high levels of understanding in shorthand theory are unessential should be subjected to research.

Since the shorthand teaching methodology recommended by the authors of the Gregg Shorthand text is based upon the assumption that students

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do not benefit from high levels of knowledge of shorthand theory, recommended teaching methodology currently places little emphasis on shorthand theory. However, since such a high correlation apparently does exist between the student's ability to write accurate shorthand outlines and his achievement in shorthand dictation, at least nine prevalent practices in shorthand teaching methodology currently recommended by the authors of the Gregg Shorthand text should be critically examined.

1. Are shorthand word-list tests as detrimental as the authors of the Gregg Shorthand text claim? If being highly proficient in knowledge of shorthand theory does not benefit the student, then this knowledge need not be tested; however, based upon the high positive correlation between the student's ability to write accurate shorthand outlines and his achievement in shorthand dictation, it would seem that shorthand word-list tests would prove beneficial for the students. It may be that word-list tests would motivate the students in their study of shorthand theory and would assist the teacher in identifying learning difficulties of the shorthand students.

2. Is no more than a 60 per cent knowledge of the abbreviating devices of the shorthand system sufficient for vocational purposes? If it were true that the student's ability to write accurate shorthand had little influence on his dictation achievement, then there would be no need to place emphasis upon a high-level mastery of shorthand theory. However, since there is a significant positive correlation between the ability of the student to write accurate shorthand outlines and achievement in shorthand dictation, it would appear that a much higher level of mastery of shorthand theory would not only be desirable but would be essential for continued success in the shorthand skill.

3. Should students not be allowed to write shorthand before Assignment 19 is presented? If the writing of shorthand were not postponed for the first four weeks, the student's application of shorthand theory might be facilitated.

4. Should no new-matter dictation be given until the beginning of the second semester? It may be that the dictation of graded new-matter material earlier in the year would encourage the students to apply the shorthand theory which they were currently studying.

5. Should shorthand students write only once the connected material for each lesson? Perhaps the student's understanding of the shorthand theory he was currently studying would be enhanced if additional writing of the current lesson were required.

6. Is the copying from print into shorthand definitely harmful to the learner? Requiring the students to do some writing from print by means of self dictation might discourage a "rote copying" of the shorthand outlines in the lesson and would aid the students in making a more practical application of their skill.

7. Are reading rates really of little importance? The development of high reading rates might foster the development of high writing rates, especially if fluency in reading is essential to fluency in writing.

8. Should students be permitted to keep their shorthand texts open during all dictation for the entire first semester? If students were periodically required to close their texts, they might be encouraged to make an earlier application of shorthand theory by writing entirely from dictated sound, which might also prevent a "rote copying" of outlines from the text.

9. Can any shorthand outline read within the hour also be read at any time? If shorthand outlines which can be read during the day of the dictation can be read as easily and as accurately at any other time, then certainly there would be no need to ask students to read shorthand outlines which they had written several days prior. If, however, students do experience difficulty in reading "cold notes," the practice of occasionally having students read shorthand outlines which had been written on previous days might encourage the students to write legible shorthand outlines which would be recognizable at any time.

The answers to these and similar questionable practices should be sought by all shorthand teachers who are truly concerned with making their teaching more effective and with encouraging their students to attain higher standards in shorthand and transcription.

PART TWO

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CHAPTER V

CONTRASTING BELIEFS RELATED TO SHORTHAND TEACHING METHODOLOGY

The beliefs shorthand teachers hold regarding the degree of shorthand competency desirable for students to possess dictate to a large extent the teaching methodology which will be used in the classroom. Many shorthand teachers are expressing beliefs that greater teaching emphasis should be placed on shorthand theory. They are consequently suggesting teaching procedures which would place more emphasis on the student's ability to write theoretically correct shorthand outlines.

The teaching procedures recommended by the authors of the Gregg Shorthand text do not place emphasis, either directly or indirectly, on the students' writing of theoretically accurate shorthand outlines. This chapter is devoted to a discussion of recommended teaching methodology in which authorities in the area of shorthand and transcription are in disagreement with the teaching procedures recommended by Leslie and Zoubek, co-authors of the Gregg Shorthand text.

Shorthand Theory

The degree of competency desirable for the shorthand student to possess with regard to his knowledge of shorthand theory is being questioned. Liles states:

> Some teachers feel that it makes little difference whether the student is highly proficient in knowledge of

> shorthand theory or not. It has even been said that any shorthand outline which can be transcribed correctly is a correct outline.[1]

Leslie says: "A correct shorthand outline is one that is correctly transcribed."[2]

Liles continues:

> The implications of such a statement are dangerous. No one can deny that the transcript might be mailable, but many teachers infer from the statement that it is not necessary to require students to master the shorthand system taught.[3]

In commenting on this topic, Leslie writes: "It is not necessary for the stenographer to know every brief form or every abbreviating device. . . . If the learner writes correctly 70 per cent to 90 per cent of the brief form occurrences in connected matter from dictation, that should be a satisfactory record."[4]

Leslie further states:

> The stenographer has no vocational need for the highest levels of shorthand penmanship and accurate shorthand theory. The stenographer needs perhaps an 80 per cent knowledge of the brief forms, perhaps a 60 per cent knowledge of the other abbreviating devices of the shorthand system, and no measurable percentage of accuracy or consistency in the application of the niceties or intricacies of shorthand outline construction.[5]

Liles feels that "when the student is imbued with this philosophy, he will have little incentive to study shorthand. The result is that his knowledge of theory will gradually deteriorate and he will eventually be writing a system of his own. Therefore, if the student has no definite, clear-cut knowledge of theory, he is constantly thinking and deciding how each outline should be written while taking dictation."[6]

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[1] Parker Liles, "Issues in Teaching Shorthand," Balance Sheet, XLV (October, 1963), 52.

[2] Louis A. Leslie, Methods of Teaching Gregg Shorthand (New York, 1953), p. 209.

[3] Liles, *op. cit.*, p. 52.

[4] Leslie, *op. cit.*, pp. 3, 12.

[5] *Ibid.*, p. 81.

Theory Tests

According to Liles, "the same protagonists of the principle that knowledge of theory is unessential hold that theory /word-list/ tests are not only a waste of time but are definitely harmful."[7]

Leslie states:

> If there is to be a test, it should be a test that will not harm the learner. A word-list test that requires the learner to construct outlines for isolated words is definitely detrimental to the progress of the beginner.[8]

Disagreement is expressed by Liles:

> If knowledge of shorthand is unessential, then there is no need for testing knowledge. On the other hand, if knowledge is essential, the only way of determining what degree of knowledge has been achieved is by testing. . . . It should be remembered that correct shorthand will probably contribute more than any other one thing to the ultimate objective--the mailable transcript.
>
> Theory testing serves many purposes. It apprises the teacher as well as the student of the student's mastery of theory and forms the basis for counting knowledge of theory as one factor in evaluation. Theory tests motivate study on the part of the student and give an added incentive to concentration in doing homework. If the student knows he will be tested, he will put forth the necessary effort to learn the theory; otherwise, he is not likely to do so. The student reacts in accordance with the way in which he is rewarded.[9]

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[6] Liles, _op_. _cit_., p. 52.

[7] _Ibid_., p. 52.

[8] Louis A. Leslie and Charles E. Zoubek, _Teacher's Handbook for Gregg Shorthand Manual Simplified_ (New York, 1955), p. 65.

[9] Liles, _op_. _cit_., p. 52.

Anderson asks:

> Are word lists as detrimental as some authorities claim? In one study it was reported that the person who wrote the most accurate shorthand also had the most accurate transcripts.[10]

Writing of Shorthand

Differences of opinion exist with respect to when the writing of shorthand should begin. In the teacher's manual for Gregg Shorthand, Leslie states: "The learners read for the first eighteen assignments. Writing begins when Assignment 19 is presented."[11]

Some authorities have suggested that better results might be secured by introducing writing earlier rather than postponing it for the first four weeks.[12]

Condon says:

> Psychologically speaking, it is apparent that the writing approach has several key advantages. Students enter the shorthand class expecting to write shorthand, so why not capitalize upon this desire and let them write.[13]

Perry also advocates earlier writing by the shorthand students:

> For many years some shorthand authorities have suggested that teachers of elementary shorthand teach the subject by using the reading approach; that is, have the

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[10] Ruth I. Anderson, "Shorthand and Transcription," Research by the Classroom Business Teacher, Eighteenth Yearbook of the Eastern Business Teachers Association and National Business Teachers Association (Somerville, New Jersey, 1961), p. 129.

[11] Leslie, op. cit., Teacher's Handbook, p. 25.

[12] Although Leslie does not recommend the introduction of writing prior to Lesson 19, he does suggest that teachers who feel earlier writing is beneficial might introduce writing as early as Lesson 6.

[13] Arnold Condon, "How Can Shorthand Be Introduced Most Effectively?" Business Education Forum, XIX (October, 1964), 10.

> students read only for a number of lessons, both in class and as homework assignments, before attempting to write shorthand. . . . After teaching shorthand using the reading approach, I found that the technique left a great deal to be desired. Not only was I dissatisfied with the way the shorthand was being presented, but I was not satisfied with the progress my students were making in their attempt to read and write shorthand.[14]

Student Use of the Shorthand Textbook While Writing Dictation

There is also some question as to the desirability of permitting students to keep their shorthand texts open during all dictation for the entire first semester and with the postponing of any new matter dictation until the completion of the theory course.

Zoubek writes:

> Are you asking your students to take dictation with their books closed? If so, you are making things difficult for them. They will progress faster with less effort if you permit them to keep their books open during all dictation in the theory course /first semester/. In fact, you should insist that they keep their books open.[15]

Hosler comments on such a practice when he says:

> The various teacher's manuals for the shorthand textbooks suggest a very desirable procedure; namely, that students be permitted to leave their textbooks open as the letters or other connected material are dictated, enabling them to refer to the textbook for help on individual outlines. While this procedure is a very desirable one, there is great danger that it will be used incorrectly. I have observed a great number of classes in beginning shorthand where the teacher has followed this procedure, but where students, instead of referring to the textbook when they need help, actually copy outline for outline and do not really take the material from dictation. In

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[14] Devern Perry, "Shorthand Success Through Writing," Balance Sheet, XVLI (September, 1964), 17.

[15] Charles E. Zoubek, "Still Time for Salvage," Business Teacher, XXXVIII (September-October, 1960), 21.

> some cases like this the students are merely 'copying pictures' rather than mentally forming shorthand outlines from dicta ted sounds.[16]

Zoubek says:

> Even if the students seem to be copying from the book without any attention to the dictation, they are growing and that growth will be reflected in their eventual ability to take new-matter dictation when it is introduced at the end of the theory course [first semester].[17]

Condon, however, appears to be in agreement with Hosler:

> When taking dictation, there is an inherent danger in having the lesson material so readily available. Students must be restrained from freely referring to the shorthand plate when taking dictation. If students are allowed to copy the material from the text as it is dictated, they will become dependent upon the visual stimulus and unable to train their minds to supply the necessary visual image.[18]

Introduction of New-Matter Material

"The authors [of Gregg Shorthand] recommend that no new-matter dictation be attempted until the beginning of the second semester."[19] "The author's [Leslie] experience has convinced him that new-matter dictation should not be given until the completion of theory."[20]

In disagreeing, Condon states:

> If no graded new-matter dictation is given up to the time theory is completed, the student is sure to experience difficulty when he first attempts to take new ungraded

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[16] Russell J. Hosler, "How Can Facility with the Shorthand System Be Developed Best," *Business Education Forum*, XIX (October, 1964), 13.

[17] Zoubek, *op*. *cit*., p. 21.

[18] Condon, *op*. *cit*., "Principles for the Development of Theory and the Building of Writing Skills in First-Year Shorthand," p. 144.

[19] Leslie, *op*. *cit*., *Teacher's Handbook*, p. 35.

[20] Leslie, *op*. *cit*., *Methods of Teaching*, p. 69.

> dictation. This difficulty may be minimized by introducing graded new-matter dictation relatively early in the course.[21]

Anderson poses these questions:

> Do you get better results by deferring new-matter dictation? Could it be introduced earlier, thereby shortening the entire learning process? Will not serious consideration have to be given to this possibility if we are to develop a usable skill in the one-year shorthand program? Remember, there are many, many high schools now offering only one year.[22]

Direct Teacher Supervision of Students

Leslie states:

> When you dictate, dictate as inconspicuously as possible. Let the learners understand you are not watching them. If the teacher 'wanders steadily' up and down the aisles, he spreads alarm and nervousness along his path. . . . As the teacher goes up and down the aisles, the nervous learners react to his vigilance by increased nervousness and tension, which manifests itself in pen-pinching.[23]

Disagreement with this procedure has also been raised. If the shorthand teacher possesses the rapport in the classroom which a teacher should possess, it is doubtful that occasional direct supervision by the teacher should render the students emotionally unstable. It is possible that such a practice might reveal information which might be of assistance to the learners.

Shorthand Homework

Writing Practice

With respect to the writing of shorthand for homework, Leslie states: "The writer strongly urges the teacher to have the learner copy only once the graded connected material for each lesson."[24]

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[21] Condon, op. cit., "Principles for the Development of Theory and the Building of Writing Skills in First-Year Shorthand," p. 15.

[22] Anderson, op. cit., p. 130.

[23] Leslie, op. cit., Methods of Teaching, p. 269. [24] Ibid., p. 77.

Condon disagrees by stating:

> Copying even rather long sustained takes /assignments/ one or two times is not sufficient to produce the best results. Evidence suggests that there is a direct relationship between achievement and the amount of homework writing practice done. This would suggest that a greater emphasis should be placed on homework writing practice.[25]

Copying from Print

Concerning the copying of print into shorthand, Leslie says:

> Copying from print into shorthand is not only of little value, it is definitely harmful to the learner. . . . Anything that contributes to hesitation in writing should be avoided. No one factor in shorthand teaching contributes more to the development of a hesitating style of shorthand writing than copying from print into shorthand.[26]

Lamb questions this objection:

> Just why students should hesitate so much if they are using the transcript of shorthand plates for this practice is a mystery to many teachers, for they /the students/ may refer to the shorthand plates when in doubt as rapidly as they refer to the transcript when copying shorthand. Moreover, the fact that a student hesitates in his first practice in constructing outlines does not mean that she will form the habit of hesitating on constructing words. She has acquired real fluency in spelling outlines--that is, breaking outlines down into their component characters by sight--and now she needs a little time to do this by sound, and one aid is the printed key that the student can read aloud to herself as she writes the shorthand outlines, turning to the shorthand plates for help when necessary and then checking her notes with the shorthand plates to detect significant differences.[27]

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[25] Condon, op. cit., "How Can Shorthand Be Introduced Most Effectively?" p. 15.

[26] Leslie, op. cit., Methods of Teaching, p. 7.

[27] Marion M. Lamb, Your First Year of Teaching Shorthand and Transcription, Second Edition (Cincinnati, 1961), p. 52.

Shorthand Reading Rates

With regard to reading rates, Leslie writes:

> The ability to read any given outline or group of outlines rapidly 'today' is not important. Undue emphasis on premature reading speed on connected matter defeats its own purpose and hampers the development of genuine reading speed. When the homework assignment consists of a relatively small amount of connected matter to be read over and over until it has been partially memorized, it is possible for the learner to read it glibly with no prompting. This is not a good symptom of shorthand learning.[28]

A somewhat different philosophy toward reading rates is expressed in the Course Guide for Shorthand One prepared by the Professional Standards and Advancement Committee of the Texas Business Education Association:

> During the first three weeks of shorthand instruction, teaching emphasis is placed on the development of reading skill. After writing is introduced, less class time is devoted to reading practice. However, students should be expected to increase their reading rates throughout the semester. . . . At least three reading rates should be recorded for each student during each of the six grading periods. Minimum speeds for reading rates for each grading period respectively are 80 words a minute, 90 words a minute, 120 words a minute, 130 words a minute, 150 words a minute, and 170 words a minute.[29]

Obviously, such a scale designed to measure the student's ability to read any given outline or group of outlines at a minimum rate of speed "today" does place importance upon his ability to read shorthand rapidly.

Lamb also advocates the timing of reading rates:

> Timed reading of shorthand plates and notes should be a daily activity in both elementary and advanced shorthand classes, for fluency in reading is essential to fluency in transcribing. Part of every homework assignment

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[28] Leslie, op. cit., Teacher's Handbook, p. 59.

[29] Course Guide for Shorthand One, Texas Education Agency (Summer, 1964), p. 4.

> should be the rapid reading aloud of textbook plates and written notes so that they may be read in class the next day without hesitation. Students should be asked to read these prepared passages under timing in class frequently enough to ensure home practice.[30]

Reading of "Cold Notes"

Another apparent area of disagreement in shorthand teaching methodology is the practice of having students read back "cold notes."

Leslie states:

> Cold notes are normally impossible in a connective vowel system such as Gregg Shorthand. . . . Ordinarily, notes that can be read today can be read tomorrow or can be read a thousand years from now. Perhaps it should be said conversely that notes that cannot be read next year cannot be read today.[31]

Some teachers have observed that shorthand students do experience difficulty in reading "cold notes." Students who can read or transcribe shorthand notes during the hour the dictation was given do not necessarily possess the ability to read or transcribe the same notes a few days later.

Other shorthand instructors have suggested that providing for an occasional opportunity in reading "cold notes" emphasizes to the students the importance of writing legible shorthand outlines. The more legible shorthand outlines, in turn, result in more easily read "warm notes."

Since shorthand teachers seldom require students to read or transcribe notes written even as much as one or two days earlier, many teachers may not fully realize what a problem this can be for the students. Some class time could profitably be spent in this acitivity.

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[30] Lamb, _op_. _cit_., p. 108.

[31] Louis A. Leslie, _Methods of Teaching Transcription_ (New York, 1949), p. 160.

Conclusion

There is certainly no reason to believe that Liles is not correct when he says that "more so-called 'accepted' principles of teaching methodology in the field of shorthand exist without any objective evidence based on sound research than in any other business subject."[32] It is indeed unfortunate that the research data upon which the shorthand authors base many of their conclusions are never published. Certainly many of the commonly accepted principles of teaching methodology which have been established by shorthand authors should be tested. After such tests have been conducted by either an individual or a publishing company, the research data should be made public. It is only through such dissemination of research data that one can effectively and objectively evaluate the conclusions which are drawn from the data.

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[32] Liles, *op. cit.*, p. 52.

CHAPTER VI

THE PROBLEM

> The area of shorthand and transcription still remains an area in which all too often teaching procedures have been based on opinions rather than sound research. Because it has been said repeatedly that certain procedures would produce the best results, the classroom teacher has been inclined to accept these statements without question. . . . We need to test many of the teaching methods that have been acclaimed by both authors and publishers as being the 'one best method' of teaching shorthand.[1]

Statement of the Problem

This study was a comparative analysis of the results obtained through the use of two different approaches in the teaching of shorthand. The two approaches were: Approach A, instruction in shorthand utilizing procedures propounded by the authors of Gregg shorthand; and Approach B, instruction in shorthand using procedures recommended by authorities in shorthand methodology which differ significantly from those procedures established by the authors of Gregg shorthand.

Significance of the Study

Instructors of shorthand have been concerned with empirical evidence to support the use of teaching procedures utilizing new methods and techniques of instruction. After consideration of the many contrasting beliefs regarding shorthand teaching methodology, it becomes increasingly apparent that a need does exist for evidence based on research relating to the merits of divergent teaching procedures. When one considers that "a larger percentage of students fail shorthand than any other subject,"[2] the significance of research in the area of shorthand methodology becomes even more evident.

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[1] Ruth I. Anderson, "Shorthand and Transcription," Research by the Classroom Business Teacher, Eighteenth Yearbook of the Eastern Business Teachers Association and National Business Teachers Association (Somerville, New Jersey, 1961), p. 125.

Of the principles of teaching shorthand outlined by Leslie[3] and Zoubek, nine areas have generated the most disagreement. From these areas of disagreement, the following nine questions have evolved:

1. Is there a significant relationship between the student's competency in the application of shorthand theory and his achievement in shorthand dictation?
2. Are shorthand theory tests detrimental to the progress of the shorthand student?
3. Should students not be allowed to write shorthand before Assignment 19 is presented?
4. Should students be allowed to keep their shorthand texts open during all dictation for the entire first semester?
5. Should no new-matter dictation be given until the beginning of the second semester?
6. Is direct teacher supervision of shorthand students a hindrance rather than a help to the students?
7. For shorthand homework, should the students copy only once the connected material for each lesson? Is a homework assignment which requires the student to copy from print into shorthand definitely harmful to the learner?
8. Are shorthand reading rates of little importance to the progress of the student?
9. Can any shorthand outline read within the hour be read at any time?

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[2] William Selden, "Guidance for Business Education," The Vocational Guidance Quarterly, XII, No. 2, Winter 1963-1964, p. 108.

[3] Louis A. Leslie, Methods of Teaching Gregg Shorthand (New York, 1953), pp. 77, 81, 92, 169, 191, 208, 267, 269, 279, and 454.

The significance of this study is that it serves to evaluate proposed teaching procedures by shorthand authorities which differ significantly from those teaching procedures established by the authors of the Gregg Shorthand texts. If significant differences in achievement are found favoring the experimental group, Approach B, as compared with the control group, Approach A, this study would suggest the possibility of a more effective method of shorthand instruction than that currently recommended by the authors of the shorthand texts.

Purposes of the Study

The primary purpose of this investigation was to compare the results obtained from contrasting teaching methods as measured by achievement in shorthand dictation. Comparisons were made in the following areas at the end of the winter and spring quarters:

1. Comparison between the control and the experimental groups on shorthand dictation achievement.

2. Comparison between the control and the experimental groups on shorthand accuracy.

3. Comparison between the control and the experimental groups on shorthand transcription.

An analysis was also made to determine the relationship between

1. The ability of the student in the control group to write accurate shorthand outlines and his achievement in shorthand dictation and the ability of the student in the experimental group to write accurate shorthand outlines and his achievement in shorthand dictation.

2. The ability of the student in the control group to write accurate shorthand outlines and his ability to transcribe the outlines

and the ability of the student in the experimental group to write accurate shorthand outlines and his ability to transcribe the outlines.

3. The ability of the student in the control group to transcribe isolated shorthand outlines and his achievement in shorthand dictation and the ability of the student in the experimental group to transcribe isolated shorthand outlines and his achievement in shorthand dictation.

4. The student's I. Q. in the control group and his (a) ability to write accurate shorthand outlines, (b) ability to transcribe shorthand outlines, and (c) achievement in shorthand dictation and the student's I. Q. in the experimental group and his (a) ability to write accurate shorthand outlines, (b) ability to transcribe shorthand outlines, and (c) achievement in shorthand dictation.

The researcher also desired to know whether any of the coefficients of correlation found in the control group and in the experimental group on the variables studied were significantly different.

Hypotheses

The study included the following hypotheses:

1. There will be a significant difference between the control and the experimental groups on shorthand dictation achievement.

2. There will be a significant difference between the control and the experimental groups on shorthand accuracy.

3. There will be a significant difference between the control and the experimental groups on shorthand transcription.

It was also hypothesized that there would be a significant positive relationship between

1. The ability of the student in the control group to write accurate shorthand outlines and his achievement in shorthand dictation

and the ability of the student in the experimental group to write accurate shorthand outlines and his achievement in shorthand dictation.

2. The ability of the student in the control group to write accurate shorthand outlines and his ability to transcribe the outlines and the ability of the student in the experimental group to write accurate shorthand outlines and his ability to transcribe the outlines.

3. The ability of the student in the control group to transcribe isolated shorthand outlines and his achievement in shorthand dictation and the ability of the student in the experimental group to transcribe isolated shorthand outlines and his achievement in shorthand dictation.

It was hypothesized that there would be a nonsignificant relationship between the student's I. Q. in the control group and his (a) ability to write accurate shorthand outlines, (b) ability to transcribe shorthand outlines, and (c) achievement in shorthand dictation and the student's I. Q. in the experimental group and his (a) ability to write accurate shorthand outlines, (b) ability to transcribe shorthand outlines, and (c) achievement in shorthand dictation.

The researcher also hypothesized there would be no significant difference between any of the coefficients of correlation found in the control group and in the experimental group on the variables studied.

Definition of Terms

1. Shorthand Theory. As used in this study, shorthand theory refers to the correct application of rules or principles for writing rather than the rote memorization of such rules.

2. Shorthand Word-List Test. Each shorthand word-list test consists of 200 words sampled from Silverthorn's High Frequency Business

Vocabulary Word List.[4] These 200 words were dictated to the students at the rate of one word every four seconds. After the 200 words were dictated, the students transcribed the list.

3. Shorthand Accuracy Index. The student's shorthand accuracy index represents the highest number of shorthand outlines which he is able to write correctly on any one of the three shorthand word-list tests.

4. Shorthand Transcription Index. The student's shorthand transcription index represents the highest number of shorthand outlines which he is able to transcribe correctly on any one of the three shorthand word-list tests.

5. Unfamiliar, Non-Previewed Dictation. Unfamiliar, non-previewed dictation refers to dictation material taken from copy with which the students are not familiar. No words contained in the copy are written for the students either before or after the dictation.

6. Shorthand Dictation Ability. The highest speed at which a student is able to take a three-minute, unfamiliar, non-previewed dictation and transcribe with no more than three per cent shorthand transcription error represents his shorthand dictation ability.

7. Cold Notes. Cold notes refer to shorthand notes which are written at such a length of time prior to their transcription that the transcriber would not ordinarily be able to rely on his memory for transcribing the notes but would have to rely on the legibility of the shorthand outlines. In this study, cold notes refer to any shorthand notes which were written at least one week prior to their transcription.

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[4] J. E. Silverthorn, High Frequency Business Vocabulary Word List (Dallas, 1958).

8. Measured Intelligence. Measured intelligence refers to the score obtained from the Otis Test of Mental Maturity.[5]

9. Shorthand Transcription Error. An error which is attributable to the incorrect transcription of a shorthand outline.

10. Non-shorthand Transcription Error. An error in spelling, grammar, or punctuation.

11. Instructional Quarter. A unit of instruction approximately twelve weeks in duration. As used in this study, the fall, winter, and spring quarters refer to the first, second, and third twelve-week unit of instruction of the academic school year.

Procedures for Collecting and Treating Data

Two control classes and two experimental classes in first-year shorthand at Louisiana Polytechnic Institute participated in this study. There were 40 students in the experimental group and 39 students in the control group. One control class and one experimental class were each taught during the same period of the day, with Professors Frank M. Busch and Joe M. Pullis each teaching one control and one experimental class. No students registering for the beginning shorthand course had received previous instruction in shorthand. When the students first registered for the course, no distinction was made on their schedules as to the particular class they would enter. In order to randomly distribute the shorthand students into four classes, each student was assigned a number. A table of random numbers was then utilized for determining student placement into the control and experimental classes. After students had been randomly assigned to each class, the determination of which class was a control class and which class was an experimental class was also made by a random selection.

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[5] Otis Quick-Scoring Mental Maturity Tests, Beta Test, Form Em.

Instruction in shorthand using procedures propounded by the authors of Gregg shorthand was designated as Approach A, and instruction in shorthand using procedures recommended by authorities in shorthand methodology which differ significantly from those procedures established by the authors of Gregg shorthand was designated as Approach B.

Differences in teaching methodology between Approach A, the control group, and Approach B, the experimental group, were as follows:

1. In the experimental classes, students were encouraged to write theoretically accurate shorthand outlines. In the control classes, emphasis was placed only upon the student's writing of shorthand outlines which could be correctly transcribed.

2. Weekly theory, or word-list, tests consisting of 25 words taken from the current week's vocabulary study were administered to the experimental classes beginning the sixth week of the fall quarter. No theory tests were given to the control classes.

3. The writing of shorthand was introduced with Assignment Six for the experimental classes and with Assignment 19 for the control classes.

4. When practicing familiar dictation, students in the experimental classes were not allowed to follow the dictation in their texts after the second reading and were encouraged to disregard the text earlier if possible. Students in the control classes were allowed to keep their textbooks open at all times while taking familiar dictation.

5. In the experimental classes, writing of graded new-matter dictation began during the fifth week of instruction. No new-matter dictation was given to the control classes until the completion of shorthand theory.

6. Teachers in the experimental classes observed daily the shorthand writing habits of their students by direct observation as students wrote. At no time did the teachers of the control classes observe directly the writing of shorthand by their students.

7. By the fourth week of instruction, students in the experimental classes wrote their homework twice, once from the connected

plate material and once from the English transcript. The control classes wrote their homework only once, and this writing was from the connected plate material.

8. In the experimental classes, at least one reading rate was recorded for each student every two weeks. Students in the control classes were never timed on speed of reading shorthand.

9. Once a week during the winter and spring quarters, students in the experimental classes were given practice drills in the reading of "cold notes." No time was spent in reading cold notes in the control classes.

So that the results of this study could be related to the findings made in the analysis of the relationship between competency in shorthand accuracy and achievement in shorthand dictation (see Part I), the procedures of data collection for the two studies were identical. In order to make the desired comparisons between the control and the experimental groups, the following procedures for collecting and analyzing data were employed.

Three weekly word-list tests of 200 words each, sampled from Silverthorn's High Frequency Business Vocabulary Word List, were administered to each class during the last three weeks of the winter and spring quarters. Silverthorn's High Frequency Business Vocabulary Word List consists of 4,950 of the most frequently used words in business communications arranged according to frequency of occurrence. For each test, 40 words were selected at random for every 1,000 words in Silverthorn's list, giving a total of 200 words.

Each test was prerecorded on tape in order to maintain a consistency of dictation for each class. After the test had been administered, the students were asked to transcribe their outlines. Both the shorthand outlines and the transcription were graded. The number of shorthand outlines which the student accurately wrote constituted his shorthand accuracy score. The number of shorthand outlines which the student transcribed correctly constituted his shorthand transcription score.

A weekly series of four unfamiliar, three-minute, non-previewed dictation tests was given to each class during the last four weeks of the winter and spring quarters. The dictation material was taken from Progressive Dictation with Previews by Zoubek. The dictation was prerecorded on tape at rates ranging from 60 to 120 words a minute. Students were asked to transcribe the highest rate which they could transcribe with no more than three per cent shorthand transcription error. The highest speed at which a student could transcribe with 97 per cent accuracy constituted his dictation rate.

In order to obtain intelligence quotient scores, the Otis Test of Mental Maturity was administered to each student participating in the study.

At the end of the winter and spring quarters, the student's highest shorthand accuracy score, transcription score, and dictation rate were recorded. The Product-Moment Correlation Coefficient was used to determine the relationship existing in the control group and the experimental group between: (a) shorthand accuracy and shorthand dictation, (b) shorthand accuracy and shorthand transcription, (c) shorthand transcription and shorthand dictation, (d) I. Q. and shorthand accuracy, (e) I. Q. and shorthand transcription, and (f) I. Q. and shorthand dictation.

$$r = \frac{\sum xy}{\sqrt{\sum x^2 \sum y^2}}$$

The critical ratio was calculated to test the hypothesis of no difference between the correlations found in the control group and those found in the experimental group on the variables studied.

$$t = \frac{z_1 - z_2}{\sqrt{\frac{1}{N_1 - 3} + \frac{1}{N_2 - 3}}}$$

After each correlation had been obtained for the control group and for the experimental group, the hypothesis that the population correlation is zero was tested.

$$\underline{t} = \frac{r}{\sqrt{1-r^2}} \sqrt{N-2}$$

If the correlation was significant at the 5 per cent level, coefficients of determination were computed.

$$r^2 = \frac{(\Sigma xy)^2}{\Sigma x^2 \Sigma y^2}$$

The *t*-test was used to determine if a significant difference existed between the control group and the experimental group in (a) shorthand dictation achievement, (b) shorthand accuracy, and (c) shorthand transcription.

$$\underline{t} = \frac{\overline{X}_1 - \overline{X}_2}{\sqrt{\dfrac{\left(\dfrac{\Sigma x_1^2 + \Sigma x_2^2}{n_1 + n_2 - 2}\right)}{n_1} + \dfrac{\left(\dfrac{\Sigma x_1^2 + \Sigma x_2^2}{n_1 + n_2 - 2}\right)}{n_2}}}$$

The shorthand dictation rates of the control group and the experimental group were categorized into dictation-rate levels. The means and standard deviations of the shorthand accuracy index, shorthand transcription index, and I. Q. were calculated for each dictation-rate level. In order to learn whether at least two of these means had a significant difference between them, an analysis of variance was computed and an F-ratio found.

Source of Variation	d. f.	Sum of Squares	Mean Square	F
Total	$N-1$	$\Sigma X_T^2 - \frac{(\Sigma X_T)^2}{N}$		
Between Groups	$K-1$	$\frac{(\Sigma X_1)^2}{N_1} + \frac{(\Sigma X_n)^2}{N_n} - \frac{(\Sigma X_T)^2}{N}$	$\frac{SS_B}{df_B}$	$\frac{MS_B}{MS_W}$
Within Groups	$N-K$	$SS_T - SS_B$	$\frac{SS_W}{df_W}$	

If it was found from the analysis of variance that there was a significant difference between at least two means in either the control group or the experimental group, _t_-tests were computed.

Plan of the Study

The remaining chapters of Part Two include Chapter VII, Presentation and Analysis of Data for the Winter Quarter; Chapter VIII, Presentation and Analysis of Data for the Spring Quarter; and Chapter IX, Summary, Findings, Conclusions, and Recommendations.

CHAPTER VII

PRESENTATION AND ANALYSIS OF DATA FOR THE CONTROL AND EXPERIMENTAL CLASSES FOR THE WINTER QUARTER

Chapter VII presents the relationship between shorthand accuracy and shorthand dictation, shorthand transcription and shorthand accuracy, and shorthand transcription and shorthand dictation for the Control and Experimental classes during the winter quarter. For analytical purposes in this study, the two control classes are referred to as the Control class or Control group and the two experimental classes are referred to as the Experimental class or Experimental group. The relationship between I. Q. and shorthand accuracy, I. Q. and shorthand transcription, and I. Q. and shorthand dictation is also given. Coefficients of determination are presented for all significant positive correlations.

In order that one might see the relationship in (a) shorthand accuracy; (b) shorthand transcription; and (c) I. Q. between all dictation-rate levels found in the study, *t*-ratios are presented for each of these variables where the analysis of variance indicates that significant differences do exist within a given variable at two or more dictation-rate levels.

Comparisons between the Control and Experimental classes on shorthand dictation achievement, shorthand accuracy, and shorthand transcription are also presented.

After the research data have been presented and analyzed, a chapter summary is provided at the end of Chapter VII.

Relationship Between Shorthand Accuracy and Shorthand Dictation

Table X presents statistical measures relating to shorthand accuracy and shorthand dictation for the Control and Experimental classes.

TABLE X

STATISTICAL MEASURES RELATING TO SHORTHAND ACCURACY AND SHORTHAND DICTATION

Class	Related Variables	Mean	S.D.*	r**	r2***
Control	Shorthand Accuracy Index	113.47	21.85	.7706	.5938
	Shorthand Dictation Rate	66.25	8.32		
Experimental	Shorthand Accuracy Index	140.63	23.25	.7543	.5690
	Shorthand Dictation Rate	77.04	10.30		

*Standard Deviation
**Coefficient of Correlation
***Coefficient of Determination

The coefficient of correlation between shorthand accuracy and shorthand dictation achievement for the Control group was .7706; for the Experimental group, .7543. Both coefficients of correlation were significant at the .05 level. The critical ratio between the coefficient of correlation for the Control group and the coefficient of correlation for the Experimental group was not significant. The coefficient of determination for the Control group indicated that approximately 59 per cent of the variation in shorthand dictation achievement was explained by variation in shorthand accuracy. The coefficient of determination for the Experimental group indicated that approximately 57 per cent of the variation in shorthand dictation achievement was explained by variation in shorthand accuracy.

The shorthand dictation rates for the Control and Experimental groups listed according to the shorthand accuracy indices and the shorthand accuracy indices for the Control and Experimental groups listed according to the shorthand dictation rates are presented in Tables LXVIII, LXXXI, LXIX, and LXXXII.

Relationship Between Shorthand Accuracy and Shorthand Transcription

Table XI presents statistical measures relating to shorthand accuracy and shorthand transcription for the Control and Experimental classes.

TABLE XI

STATISTICAL MEASURES RELATING TO SHORTHAND ACCURACY AND SHORTHAND TRANSCRIPTION

Class	Related Variables	Mean	S.D.*	r**	r^2***
Control	Shorthand Accuracy Index	113.47	21.85	.9235	.8529
	Shorthand Transcription Index	138.75	26.30		
Experimental	Shorthand Accuracy Index	140.63	23.25	.9280	.8612
	Shorthand Transcription Index	163.11	20.86		

*Standard Deviation
**Coefficient of Correlation
***Coefficient of Determination

The coefficient of correlation between shorthand accuracy and shorthand transcription for the Control group was .9235; for the Experimental group, .9280. Both coefficients of correlation were significant at the .05 level. The critical ratio between the coefficient of correlation for the Control group and the coefficient of correlation for the Experimental group was not significant. The coefficient of determination for the Control group indicated that approximately 85 per cent of the variation in shorthand transcription was explained by variation in shorthand accuracy. The coefficient of determination for the Experimental group indicated that approximately 86 per cent of the variation in shorthand transcription was explained by variation in shorthand accuracy.

The shorthand transcription indices for the Control and Experimental groups listed according to the shorthand accuracy indices and the shorthand accuracy indices for the Control and Experimental groups listed according to the shorthand transcription indices are presented in Tables LXX, LXXXIII, LXXI, and LXXXIV.

Relationship Between Shorthand Transcription and Shorthand Dictation

Table XII presents statistical measures relating to shorthand transcription and shorthand dictation for the Control and Experimental classes.

TABLE XII

STATISTICAL MEASURES RELATING TO SHORTHAND TRANSCRIPTION AND SHORTHAND DICTATION

Class	Related Variables	Mean	S.D.*	r**	r^2***
Control	Shorthand Transcription Index	138.75	26.30	.7937	.6299
	Shorthand Dictation Rate	66.25	8.32		
Experimental	Shorthand Transcription Index	163.11	20.87	.7563	.5720
	Shorthand Dictation Rate	77.04	10.3		

*Standard Deviation
**Coefficient of Correlation
***Coefficient of Determination

The coefficient of correlation between shorthand transcription and shorthand dictation for the Control group was .7937; for the Experimental group, .7563. Both coefficients of correlation were significant at the .05 level. The critical ratio between the coefficient of correlation for the Control group and the coefficient of correlation for the Experimental group was not significant. The coefficient of determination for the Control group indicated that approximately 63 per cent of the variation in shorthand dictation was explained by variation in shorthand transcription (the ability to transcribe isolated shorthand outlines). Eighty-five per cent of the variation in shorthand transcription was explained by variation in shorthand accuracy. The coefficient of determination for the Experimental group indicated that approximately 57 per cent of the variation in shorthand dictation was explained by variation in shorthand transcription. Eighty-six per cent of the variation in shorthand transcription was explained by variation in shorthand accuracy.

The shorthand dictation rates for the Control and Experimental groups listed according to the shorthand transcription indices and the shorthand transcription indices for the Control and Experimental groups listed according to the shorthand dictation rates are presented in Tables LXXII, LXXXV, LXXIII, and LXXXVI.

Relationship Between I. Q. and Shorthand Accuracy

Table XIII presents statistical measures relating to I. Q. and shorthand accuracy for the Control and Experimental classes.

TABLE XIII

STATISTICAL MEASURES RELATING TO I. Q. AND SHORTHAND ACCURACY

Class	Related Variables	Mean	S.D.*	r**	r^2***
Control	Shorthand Accuracy Index	113.47	21.85	-.0767	. . .
	Intelligence Quotient Scores	113.50	6.88		
Experimental	Shorthand Accuracy Index	140.63	23.25	.2445	. . .
	Intelligence Quotient Scores	114.59	9.32		

*Standard Deviation
**Coefficient of Correlation
***Coefficient of Determination

The coefficient of correlation between shorthand accuracy and intelligence quotients for the Control group was -.0767; for the Experimental group, .2445. Neither coefficient of correlation was significant at the .05 level. The critical ratio between the coefficient of correlation for the Control group and the coefficient of correlation for the Experimental group was not significant. Since neither the coefficient of correlation between shorthand accuracy and intelligence quotients for the Control group nor the coefficient of correlation between shorthand accuracy and intelligence quotients for the Experimental group was significant, coefficients of determination were not computed.

The intelligence quotient scores for the Control and Experimental groups listed according to the shorthand accuracy indices and the shorthand accuracy indices for the Control and Experimental groups listed according to the intelligence quotient scores are presented in Tables LXXIV, LXXXVII, LXXV, and LXXXVIII.

Relationship Between I. Q. and Shorthand Transcription

Table XIV presents statistical measures relating to I. Q. and shorthand transcription for the Control and Experimental classes.

TABLE XIV

STATISTICAL MEASURES RELATING TO I. Q. AND SHORTHAND TRANSCRIPTION

Class	Related Variables	Mean	S.D.*	r**	r^2***
Control	Shorthand Transcription Index	138.75	26.30	-.0845	. . .
	Intelligence Quotient Scores	113.50	6.88		
Experimental	Shorthand Transcription Index	163.11	20.86	.2771	. . .
	Intelligence Quotient Scores	114.59	9.32		

*Standard Deviation
**Coefficient of Correlation
***Coefficient of Determination

The coefficient of correlation between shorthand transcription and intelligence quotients for the Control group was -.0845; for the Experimental group, .2771. Neither coefficient of correlation was significant at the .05 level. The critical ratio between the coefficient of correlation for the Control group and the coefficient of correlation for the Experimental group was not significant. Since neither the coefficient of correlation between shorthand transcription and intelligence quotients for the Control group nor the coefficient of correlation between shorthand transcription and intelligence quotients for the Experimental group was significant, coefficients of determination were not computed.

The intelligence quotient scores for the Control and Experimental groups listed according to the shorthand transcription indices and the shorthand transcription indices for the Control and Experimental groups listed according to the intelligence quotient scores are presented in Tables LXXVI, LXXXIX, LXXVII, and XC.

Relationship Between I. Q. and Shorthand Dictation

Table XV presents statistical measures relating to I. Q. and shorthand dictation for the Control and Experimental classes.

TABLE XV

STATISTICAL MEASURES RELATING TO I. Q. AND SHORTHAND DICTATION

Class	Related Variables	Mean	S.D.*	r**	r^2***
Control	Shorthand Dictation Rate	66.25	8.32	-.0169	. . .
	Intelligence Quotient Scores	113.50	6.88		
Experimental	Shorthand Dictation Rate	77.04	10.30	.2751	. . .
	Intelligence Quotient Scores	114.59	9.34		

*Standard Deviation
**Coefficient of Correlation
***Coefficient of Determination

The coefficient of correlation between shorthand dictation achievement and intelligence quotients for the Control group was -.0169; for the Experimental group, .2751. Neither coefficient of correlation was significant at the .05 level. The critical ratio between the coefficient of correlation for the Control group and the coefficient of correlation for the Experimental group was not significant. Since neither the coefficient of correlation between shorthand dictation achievement and intelligence quotients for the Control group nor the coefficient of correlation between shorthand dictation achievement and intelligence quotients for the Experimental group was significant, coefficients of determination were not computed.

The intelligence quotient scores for the Control and Experimental groups listed according to the shorthand dictation rates and the shorthand dictation rates for the Control and Experimental groups listed according to the intelligence quotient scores are presented in Tables LXXVIII, XCI, LXXIX, and XCII.

Relationship Between Shorthand Accuracy and Shorthand Dictation for Varying Dictation-Rate Levels in the Control and Experimental Classes

Statistical measures relating to shorthand accuracy scores classified according to shorthand dictation-rate levels for the Control and Experimental groups are presented in Tables XVI and XVII.

TABLE XVI

STATISTICAL MEASURES RELATING TO SHORTHAND ACCURACY SCORES IN THE CONTROL GROUP CLASSIFIED ACCORDING TO SHORTHAND DICTATION RATE

Shorthand Dictation-Rate Levels	Statistical Measures of Shorthand Accuracy Scores		
	Mean	S. D.	N.
60	101.1	15.6	18
70	117.9	10.7	9
80	151.8	5.9	4
90	143	0	1

TABLE XVII

STATISTICAL MEASURES RELATING TO SHORTHAND ACCURACY SCORES IN THE EXPERIMENTAL GROUP CLASSIFIED ACCORDING TO SHORTHAND DICTATION RATE

Shorthand Dictation-Rate Levels	Statistical Measures of Shorthand Accuracy Scores		
	Mean	S. D.	N.
60	114.3	22.8	4
70	125.9	20.6	7
80	146.6	9	9
90	162.9	14.2	7

As shorthand dictation rates increased in both the Control and Experimental classes, shorthand accuracy scores increased, with the exception of the student in the Control class who passed the 90 word-a-minute dictation test. An analysis of variance was computed for the Control class and for the Experimental class to determine whether at least two of the shorthand accuracy means in either or both of the respective classes had a significant difference between them.

TABLE XVIII

ANALYSIS OF VARIANCE OF SHORTHAND ACCURACY SCORES OF DICTATION-RATE LEVELS FOR THE CONTROL AND EXPERIMENTAL CLASSES

Class	Source of Variation	d.f.	Mean Square	F
Control	Between groups	3	3,219.5	17.5
	Within groups	28	183.5	
Experimental	Between groups	3	2,695.2	10.4
	Within groups	23	295.5	

An F-ratio of 17.5 was found in the Control class and 10.4 in the Experimental class. Both ratios were significant at the .05 level, indicating that within each group at least two of the shorthand accuracy means were significantly different.

Whether there were significant differences between more than two of the mean accuracy scores, and which means had significant differences, was determined from t-tests (Tables XIX and XX).

TABLE XIX

THE t-RATIOS OF SHORTHAND ACCURACY SCORES OF THE VARYING DICTATION-RATE LEVELS IN THE CONTROL CLASS

Shorthand Dictation-Rate Level	Shorthand Dictation-Rate Level		
	80	70	60
90	-1.32	2.23*	2.62*
80		5.86*	6.30*
70			2.89*

*Significant at the .05 level

TABLE XX

THE t-RATIOS OF SHORTHAND ACCURACY SCORES OF THE VARYING DICTATION-RATE LEVELS IN THE EXPERIMENTAL CLASS

Shorthand Dictation-Rate Level	Shorthand Dictation-Rate Level		
	80	70	60
90	2.80*	3.91*	4.42*
80		2.72*	3.79*
70			.87

*Significant at the .05 level

There were significant differences in the Control group in shorthand accuracy between the following dictation-rate levels: 90 and 70; 90 and 60; 80 and 70; 80 and 60; and 70 and 60.

There were significant differences in the Experimental group in shorthand accuracy between the following dictation-rate levels: 90 and 80; 90 and 70; 90 and 60; 80 and 70; and 80 and 60.

Relationship Between Shorthand Transcription and Shorthand Dictation for Varying Dictation-Rate Levels in the Control and Experimental Classes

Statistical measures relating to shorthand transcription scores classified according to shorthand dictation-rate levels for the Control and Experimental groups are presented in Tables XXI and XXII.

TABLE XXI

STATISTICAL MEASURES RELATING TO SHORTHAND TRANSCRIPTION SCORES IN THE CONTROL GROUP CLASSIFIED ACCORDING TO SHORTHAND DICTATION RATE

Shorthand Dictation-Rate Level	Statistical Measures of Shorthand Accuracy Scores		
	Mean	S. D.	N.
60	122.7	16.8	18
70	147	16.3	9
80	183.3	4.7	4
90	175	0	1

TABLE XXII

STATISTICAL MEASURES RELATING TO SHORTHAND TRANSCRIPTION SCORES IN THE EXPERIMENTAL GROUP CLASSIFIED ACCORDING TO SHORTHAND DICTATION RATE

Shorthand Dictation-Rate Level	Statistical Measures of Shorthand Accuracy Scores		
	Mean	S. D.	N.
60	131.3	22	4
70	155	14.5	7
80	171.2	11.6	9
90	179	10.3	7

As shorthand dictation rates increased in both the Control and Experimental classes, shorthand transcription scores (the ability to transcribe isolated shorthand outlines) increased at every dictation-rate level with the exception of the student in the Control class who passed a 90 word-a-minute dictation test. An analysis of variance was computed for the Control class and for the Experimental class to determine whether at least two of the shorthand transcription means in either or both of the respective classes had a significant difference between them (Table XXIII).

TABLE XXIII

ANALYSIS OF VARIANCE OF SHORTHAND TRANSCRIPTION SCORES OF DICTATION-RATE LEVELS FOR THE CONTROL AND EXPERIMENTAL CLASSES

Class	Source of Variation	d.f.	Mean Square	F
Control	Between groups	3	4,823.9	19.4
	Within groups	28	249.2	
Experimental	Between groups	3	2,293.5	11.9
	Within groups	23	192.8	

An F-ratio of 19.4 was found in the Control class and 11.9 in the Experimental class. Both ratios were significant at the .05 level, indicating that within each group at least two of the shorthand transcription means were significantly different.

Whether there were significant differences between more than two of the mean transcription scores, and which means had significant differences was determined from _t_-tests (Tables XXIV and XXV).

TABLE XXIV

THE t-RATIOS OF SHORTHAND TRANSCRIPTION SCORES OF THE VARYING DICTATION-RATE LEVELS IN THE CONTROL CLASS

Shorthand Dictation-Rate Level	Shorthand Dictation-Rate Level		
	80	70	60
90	-1.56	1.63	3.03*
80		4.28*	7.02*
70			3.58*

*Significant at the .05 level

Table XXV

THE t-RATIOS OF SHORTHAND TRANSCRIPTION SCORES OF THE VARYING DICTATION-RATE LEVELS IN THE EXPERIMENTAL CLASS

Shorthand Dictation-Rate Level	Shorthand Dictation-Rate Level		
	80	70	60
90	1.39	3.57*	4.99*
80		2.49*	4.38*
70			2.17*

*Significant at the .05 level

There were significant differences in the Control group in shorthand transcription indices between the following dictation-rate levels: 90 and 60; 80 and 70; 80 and 60; and 70 and 60.

There were significant differences in the Experimental group in shorthand transcription indices between the following dictation-rate levels: 90 and 70; 90 and 60; 80 and 70; 80 and 60; and 70 and 60.

Relationship Between Intelligence Quotient Means for Varying Dictation-Rate Levels in the Control and Experimental Classes

Statistical measures relating to intelligence quotient means classified according to shorthand dictation-rate levels for the Control and Experimental groups are presented in Tables XXVI and XXVII.

TABLE XXVI

STATISTICAL MEASURES RELATING TO INTELLIGENCE QUOTIENT SCORES IN THE CONTROL GROUP CLASSIFIED ACCORDING TO SHORTHAND DICTATION RATE

Shorthand Dictation-Rate Level	Statistical Measures of Shorthand Accuracy Scores		
	Mean	S. D.	N.
60	113.4	7.5	18
70	114.6	6.5	9
80	110.3	5.9	4
90	118	0	1

TABLE XXVII

STATISTICAL MEASURES RELATING TO INTELLIGENCE QUOTIENT SCORES IN THE EXPERIMENTAL GROUP CLASSIFIED ACCORDING TO SHORTHAND DICTATION RATE

Shorthand Dictation-Rate Level	Statistical Measures of Shorthand Accuracy Scores		
	Mean	S. D.	N.
60	110.5	12.6	4
70	114.1	7.9	7
80	113.1	9.5	9
90	119.3	8.6	7

An analysis of variance was computed for the Control class and for the Experimental class to determine whether at least two of the intelligence quotient means in either or both of the respective classes differed significantly (Table XXVIII).

TABLE XXVIII

ANALYSIS OF VARIANCE OF INTELLIGENCE QUOTIENT SCORES
OF DICTATION-RATE LEVELS FOR THE CONTROL
AND EXPERIMENTAL CLASSES

Class	Source of Variation	d.f.	Mean Square	F
Control	Between groups	3	24.2	0.5
	Within groups	28	49.8	
Experimental	Between groups	3	80.8	0.9
	Within groups	23	87.8	

An F-ratio of 0.5 was found in the Control class and 0.9 in the Experimental class. Neither ratio was significant at the .05 level, indicating there was no statistically significant difference in intelligence at the different shorthand dictation-rate levels.

Comparison Between the Control and Experimental Classes in Shorthand Dictation

In the Control class, shorthand dictation rates ranged from 60 words a minute to 90 words a minute:

Dictation-Rate Level	Number of Students
60	18
70	9
80	4
90	1

In the Experimental class, shorthand dictation rates also ranged from 60 words a minute to 90 words a minute:

Dictation-Rate Level	Number of Students
60	4
70	7
80	9
90	7

The median average dictation rate for the Control class was 60 words a minute; for the Experimental class, 80 words a minute. The mean average dictation rate for the Control class was 66.25 words a minute; for the Experimental class, 77 words a minute. The critical ratio between the two means was 4.45, which was significant at the .05 level. The Experimental class was significantly superior in shorthand dictation achievement.

Comparison Between the Control and Experimental Classes in Shorthand Accuracy

The accuracy indices for the varying dictation-rate levels in the Control class ranged from 101.1 to 151.8:

Dictation-Rate Level	Number of Students	Accuracy Index
60	18	101.1
70	9	117.9
80	4	151.8
90	1	143

The accuracy indices for the varying dictation-rate levels in the Experimental class ranged from 114.3 to 162.9:

Dictation-Rate Level	Number of Students	Accuracy Index
60	4	114.3
70	7	125.9
80	9	146.6
90	7	162.9

The mean average accuracy index for the Control group was 113.5; for the Experimental group, 140.6. The critical ratio between the two means was 4.62, which was significant at the .05 level. The Experimental class was significantly superior in ability to write accurate shorthand outlines.

Comparison Between the Control and Experimental Classes in Shorthand Transcription

The transcription indices for the varying dictation-rate levels in the Control class ranged from 122.7 to 183.3:

Dictation-Rate Level	Number of Students	Transcription Index
60	18	122.7
70	9	147
80	4	183.3
90	1	175

The transcription indices for the varying dictation-rate levels in the Experimental class ranged from 131.3 to 179:

Dictation-Rate Level	Number of Students	Transcription Index
60	4	131.3
70	7	155
80	9	171.2
90	7	179

The mean average transcription index for the Control group was 138.7; for the Experimental group, 163.1. The critical ratio between the two means was 3.89, which was significant at the .05 level. The Experimental class was significantly superior in transcription ability.

Chapter Summary

The coefficient of correlation between shorthand accuracy and shorthand dictation for the Control and Experimental groups was .7706 and .7543 respectively; between shorthand accuracy and shorthand transcription, .9235 and .9280; and between shorthand transcription and shorthand dictation, .7937 and .7563. Each of these coefficients of correlation was significant at the .05 level. None of the coefficients of correlation between I. Q. and shorthand dictation, shorthand accuracy, or shorthand transcription was statistically significant for either the Control class or the Experimental class.

As shorthand dictation rates increased in both the Control and Experimental classes, shorthand accuracy scores increased, with the exception of the student in the Control class who passed a 90 word-a-minute dictation test. There were significant differences in the Control group in shorthand accuracy between the following dictation-rate levels: 90 and 70; 90 and 60; 80 and 70; 80 and 60; and 70 and 60. There were significant differences in the Experimental group in shorthand accuracy between the following dictation-rate levels: 90 and 80; 90 and 70; 90 and 60; 80 and 70; and 80 and 60.

As shorthand dictation rates increased in both the Control and Experimental classes, shorthand transcription scores (the ability to transcribe isolated shorthand outlines) increased at every dictation-rate level with the exception of the student in the Control class who passed a 90 word-a-minute dictation test. There were significant differences in the Control group in shorthand transcription indices between the following dictation-rate levels: 90 and 60; 80 and 70; 80 and 60; and 70 and 60. There were significant differences in the

Experimental group in shorthand transcription indices between the following dictation-rate levels: 90 and 70; 90 and 60; 80 and 70; 80 and 60; and 70 and 60.

The mean average accuracy index for the Control group was 113.5; for the Experimental group, 140.5. The critical ratio between the two means was 4.62, which was significant at the .05 level. The Experimental class was significantly superior in ability to write accurate shorthand outlines.

The mean average transcription index for the Control group was 138.7; for the Experimental group, 163.1. The critical ratio between the two means was 3.89, which was significant at the .05 level. The Experimental class was significantly superior in transcription ability.

The median average dictation rate for the Control class was 60 words a minute; for the Experimental class, 80 words a minute. The mean average dictation rate for the Control class was 66.25 words a minute; for the Experimental class, 77 words a minute. The critical ratio between the two means was 4.45, which was significant at the .05 level. The Experimental class was significantly superior in shorthand dictation ability.

CHAPTER VIII

PRESENTATION AND ANALYSIS OF DATA FOR THE CONTROL AND EXPERIMENTAL CLASSES FOR THE SPRING QUARTER

Chapter VIII presents the relationship between shorthand accuracy and shorthand dictation, shorthand transcription and shorthand accuracy, and shorthand transcription and shorthand dictation for the Control and Experimental classes during the spring quarter. The two control classes in this study are referred to as the Control class or Control group, and the two experimental classes in the study are referred to as the Experimental class or Experimental group. The relationship between I. Q. and shorthand accuracy, I. Q. and shorthand transcription, and I. Q. and shorthand dictation is given. Coefficients of determination are presented for all significant positive correlations.

In order that one might see the relationship in (a) shorthand accuracy; (b) shorthand transcription; and (c) I. Q. between all dictation-rate levels found in the study, _t_-ratios are presented for each of these variables where the analysis of variance indicates that significant differences do exist within a given variable at two or more dictation-rate levels.

Comparisons between the Control and Experimental classes on shorthand dictation achievement, shorthand accuracy, and shorthand transcription are also presented.

After the research data have been presented and analyzed, a chapter summary is provided at the end of Chapter VIII.

Relationship Between Shorthand Accuracy and Shorthand Dictation

Table XXIX presents statistical measures relating to shorthand accuracy and shorthand dictation for the Control and Experimental classes.

TABLE XXIX

STATISTICAL MEASURES RELATING TO SHORTHAND ACCURACY AND SHORTHAND DICTATION

Class	Related Variables	Mean	S. D.*	r**	r^2***
Control	Shorthand Accuracy Index	121.16	23.27	.5815	.3381
	Shorthand Dictation Rate	80.80	7.58		
Experimental	Shorthand Accuracy Index	151.04	19.22	.6495	.4219
	Shorthand Dictation Rate	90.45	9.99		

*Standard Deviation
**Coefficient of Correlation
***Coefficient of Determination

The coefficient of correlation between shorthand accuracy and shorthand dictation achievement for the Control group was .5815; for the Experimental group, .6495. Both coefficients of correlation were significant at the .05 level. The critical ratio between the coefficient of correlation for the Control group and the coefficient of correlation for the Experimental group was not significant. The coefficient of determination for the Control group indicated that approximately 34 per cent of the variation in shorthand dictation achievement was explained by variation in shorthand accuracy. The coefficient of determination for the Experimental group indicated that approximately 42 per cent of the variation in shorthand dictation achievement was explained by variation in shorthand accuracy.

The shorthand dictation rates for the Control and Experimental groups listed according to the shorthand accuracy indices and the shorthand accuracy indices for the Control and Experimental groups listed according to the shorthand dictation rates are presented in Tables XCIV, CVII, XCV, and CVIII.

Relationship Between Shorthand Accuracy and Shorthand Transcription

Table XXX presents statistical measures relating to shorthand accuracy and shorthand transcription for the Control and Experimental classes.

TABLE XXX

STATISTICAL MEASURES RELATING TO SHORTHAND ACCURACY AND SHORTHAND TRANSCRIPTION

Class	Related Variables	Mean	S. D.*	r**	r^2***
Control	Shorthand Accuracy Index	121.16	23.27	.9402	.8840
	Shorthand Transcription Index	151.72	27.50		
Experimental	Shorthand Accuracy Index	151.04	19.22	.8308	.6902
	Shorthand Transcription Index	174.82	15.03		

*Standard Deviation
**Coefficient of Correlation
***Coefficient of Determination

The coefficient of correlation between shorthand accuracy and shorthand transcription for the Control group was .9402; for the Experimental group, .8308. Both coefficients of correlation were significant at the .05 level. The critical ratio between the coefficient of correlation for the Control group and the coefficient of correlation for the Experimental group was not significant. The coefficient of determination for the Control group indicated that approximately 88 per cent of the variation in shorthand transcription was explained by variation in shorthand accuracy. The coefficient of determination for the Experimental group indicated that approximately 83 per cent of the variation in shorthand transcription was explained by variation in shorthand accuracy.

The shorthand transcription indices for the Control and Experimental groups listed according to the shorthand accuracy indices and the shorthand accuracy indices for the Control and Experimental groups listed according to the shorthand transcription indices are presented in Tables XCVI, CIX, XCVII, and CX.

Relationship Between Shorthand Transcription and Shorthand Dictation

Table XXXI presents statistical measures relating to shorthand transcription and shorthand dictation for the Control and Experimental classes.

TABLE XXXI

STATISTICAL MEASURES RELATING TO SHORTHAND TRANSCRIPTION AND SHORTHAND DICTATION

Class	Related Variables	Mean	S. D.*	r**	r^2***
Control	Shorthand Transcription Index	151.72	27.50	.6616	.4377
	Shorthand Dictation Rate	80.80	7.58		
Experimental	Shorthand Transcription Index	174.82	15.03	.7144	.5104
	Shorthand Dictation Rate	90.45	9.99		

*Standard Deviation
**Coefficient of Correlation
***Coefficient of Determination

The coefficient of correlation between shorthand transcription and shorthand dictation for the Control group was .6616; for the Experimental group, .7144. Both coefficients of correlation were significant at the .05 level. The critical ratio between the coefficient of correlation for the Control group and the coefficient of correlation for the Experimental group was not significant. The coefficient of determination for the Control group indicated that approximately 44 per cent of the variation in shorthand dictation was explained by variation in shorthand transcription (the ability to transcribe isolated shorthand outlines). Eighty-eight per cent of the variation in shorthand transcription was explained by variation in shorthand accuracy. The coefficient of determination for the Experimental group indicated that approximately 71 per cent of the variation in shorthand dictation was explained by variation in shorthand transcription. Sixty-nine per cent of the variation in shorthand transcription was explained by variation in shorthand accuracy.

The shorthand dictation rates for the Control and Experimental groups listed according to the shorthand transcription indices and the shorthand transcription indices for the Control and Experimental groups listed according to the shorthand dictation rates are presented in Tables XCVIII, CXI, XCIX, and CXII.

Relationship Between I. Q. and Shorthand Accuracy

Table XXXII presents statistical measures relating to I. Q. and shorthand accuracy for the Control and Experimental classes.

TABLE XXXII

STATISTICAL MEASURES RELATING TO I. Q. AND SHORTHAND ACCURACY

Class	Related Variables	Mean	S. D.*	r**	r^2***
Control	Shorthand Accuracy Index	121.16	23.27	-.1347	. . .
	Intelligence Quotient Scores	113.64	7.26		
Experimental	Shorthand Accuracy Index	151.04	19.22	.3266	. . .
	Intelligence Quotient Scores	114.05	10.18		

*Standard Deviation
**Coefficient of Correlation
***Coefficient of Determination

The coefficient of correlation between shorthand accuracy and intelligence quotients for the Control group was -.1347; for the Experimental group, .3266. Neither coefficient of correlation was significant at the .05 level. The critical ratio between the coefficient of correlation for the Control group and the coefficient of correlation for the Experimental group was not significant. Since neither the coefficient of correlation between shorthand accuracy and intelligence quotients for the Control group nor the coefficient of correlation between shorthand accuracy and intelligence quotients for the Experimental group was significant, coefficients of determination were not computed.

The intelligence quotient scores for the Control and Experimental groups listed according to the shorthand accuracy indices and the shorthand accuracy indices for the Control and Experimental groups listed according to the intelligence quotient scores are presented in Tables C, CXIII, CI, and CXIV.

Relationship Between I. Q. and Shorthand Transcription

Table XXXIII presents statistical measures relating to I. Q. and shorthand transcription for the Control and Experimental classes.

TABLE XXXIII

STATISTICAL MEASURES RELATING TO I. Q. AND SHORTHAND TRANSCRIPTION

Class	Related Variables	Mean	S. D.*	r**	r^2***
Control	Shorthand Transcription Index	151.72	27.50	-.1820	. . .
	Intelligence Quotient Scores	113.64	7.26		
Experimental	Shorthand Transcription Index	174.82	15.03	.4068	. . .
	Intelligence Quotient Scores	114.05	10.18		

*Standard Deviation
**Coefficient of Correlation
***Coefficient of Determination

The coefficient of correlation between shorthand transcription and intelligence quotients for the Control group was -.1820; for the Experimental group, .4068. Neither coefficient of correlation was significant at the .05 level. The critical ratio between the coefficient of correlation for the Control group and the coefficient of correlation for the Experimental group was not significant. Since neither the coefficient of correlation between shorthand transcription and intelligence quotients for the Control group nor the coefficient of correlation between shorthand transcription and intelligence quotients for the Experimental group was significant, coefficients of determination were not computed.

The intelligence quotient scores for the Control and Experimental groups listed according to the shorthand transcription indices and the shorthand transcription indices for the Control and Experimental groups listed according to the intelligence quotient scores are presented in Tables CII, CXV, CIII, and CXVI.

Relationship Between I. Q. and Shorthand Dictation

Table XXXIV presents statistical measures relating to I. Q. and shorthand dictation for the Control and Experimental classes.

The coefficient of correlation between shorthand dictation achievement and intelligence quotients for the Control group was -.2741; for the Experimental group, .3979. Neither coefficient of correlation was significant. The critical ratio between the coefficient of correlation for the Control group and the coefficient of correlation for the Experimental group was not significant.

TABLE XXXIV

STATISTICAL MEASURES RELATING TO I. Q. AND SHORTHAND DICTATION

Class	Related Variables	Mean	S. D.*	r**	r^2***
Control	Shorthand Dictation Rate	80.80	7.58	-.2741	. . .
	Intelligence Quotient Scores	113.64	7.26		
Experimental	Shorthand Dictation Rate	90.45	9.99	.3979	. . .
	Intelligence Quotient Scores	114.05	10.18		

*Standard Deviation
**Coefficient of Correlation
***Coefficient of Determination

3

Since neither the coefficient of correlation between shorthand dictation achievement and intelligence quotients for the Control group nor the coefficient of correlation between shorthand dictation achievement and intelligence quotients for the Experimental group was significant, coefficients of determination were not computed.

While the difference in the coefficients of correlation between I. Q. and achievement in shorthand dictation for the Control group and the Experimental group was not statistically significant, it is large enough that some consideration should be given to additional study in this area. Realizing that students of varying intellect learn in different manners, it may be that the teaching methodology used by the shorthand teacher has appeal to the shorthand student relative to his intellectual capacities. In this same regard, shorthand systems which reduce the memory load may benefit students of lower intelligence while handicapping students of higher intelligence.

The intelligence quotient scores for the Control and Experimental groups listed according to the shorthand dictation rates and the shorthand dictation rates for the Control and Experimental groups listed according to the intelligence quotient scores are presented in Tables CIV, CXVII, CV, and CXVIII.

Relationship Between Shorthand Accuracy and Shorthand Dictation for Varying Dictation-Rate Levels in the Control and Experimental Classes

Statistical measures relating to shorthand accuracy scores classified according to shorthand dictation-rate levels for the Control and Experimental groups are presented in Tables XXXV and XXXVI.

TABLE XXXV

STATISTICAL MEASURES RELATING TO SHORTHAND ACCURACY SCORES IN THE CONTROL GROUP CLASSIFIED ACCORDING TO SHORTHAND DICTATION RATE

Shorthand Dictation-Rate Levels	Statistical Measures of Shorthand Accuracy Scores		
	Mean	S. D.	N.
70	105.2	6.4	5
80	117	21.8	14
90	143	21.9	5
100	150	0	1

TABLE XXXVI

STATISTICAL MEASURES RELATING TO SHORTHAND ACCURACY SCORES IN THE EXPERIMENTAL GROUP CLASSIFIED ACCORDING TO SHORTHAND DICTATION RATE

Shorthand Dictation-Rate Levels	Statistical Measures of Shorthand Accuracy Scores		
	Mean	S. D.	N.
70	125	0	1
80	138.3	20.6	6
90	150.1	16.2	7
100	163	11.5	7
110	176	0	1

As shorthand dictation rates increased in both the Control and Experimental classes, shorthand accuracy scores increased. An analysis of variance was computed for the Control class and for the Experimental class to determine whether at least two of the shorthand accuracy means in either or both of the respective classes had a significant difference between them (Table XXXVII).

TABLE XXXVII

ANALYSIS OF VARIANCE OF SHORTHAND ACCURACY SCORES OF DICTATION-RATE LEVELS FOR THE CONTROL AND EXPERIMENTAL CLASSES

Class	Source of Variation	d.f.	Mean Square	F
Control	Between groups	3	1,577.5	4
	Within groups	21	393.8	
Experimental	Between groups	4	819.2	3.1
	Within groups	17	263.9	

An F-ratio of 4 was found in the Control class and 3.1 in the Experimental class. Both ratios were significant at the .05 level, indicating that within each group at least two of the shorthand accuracy means were significantly different.

Whether there were significant differences between more than two of the mean accuracy scores, and which means had significant differences, was determined from t-tests (Tables XXXVIII and XXXIX).

TABLE XXXVIII

THE t-RATIOS OF SHORTHAND ACCURACY SCORES OF THE VARYING DICTATION-RATE LEVELS IN THE CONTROL CLASS

Shorthand Dictation-Rate Level	Shorthand Dictation-Rate Level		
	90	80	70
100	0.29	1.46	6.41*
90		2.29*	3.70*
80			1.17

*Significant at the .05 level

TABLE XXXIX

THE t-RATIOS OF SHORTHAND ACCURACY SCORES OF THE VARYING DICTATION-RATE LEVELS IN THE EXPERIMENTAL CLASS

Shorthand Dictation-Rate Level	Shorthand Dictation-Rate Level			
	100	90	80	70
110	1.05	1.49	1.69	0**
100		1.71	2.72*	3.08*
90			1.16	1.45
80				0.60

*Significant at the .05 level
**Only one student at 70 words a minute and one student at 110 words a minute.

There were significant differences in the Control group in shorthand accuracy between the following dictation-rate levels: 100 and 70; 90 and 80; and 90 and 70.

There were significant differences in the Experimental group in shorthand accuracy between the following dictation-rate levels: 100 and 80; and 100 and 70.

Relationship Between Shorthand Transcription and Shorthand Dictation for Varying Dictation-Rate Levels in the Control and Experimental Classes

Statistical measures relating to shorthand transcription scores classified according to shorthand dictation-rate levels for the Control and Experimental groups are presented in Tables XXXX and XXXXI.

TABLE XXXX

STATISTICAL MEASURES RELATING TO SHORTHAND TRANSCRIPTION SCORES IN THE CONTROL GROUP CLASSIFIED ACCORDING TO SHORTHAND DICTATION RATE

Shorthand Dictation-Rate Levels	Statistical Measures of Shorthand Accuracy Scores		
	Mean	S. D.	N.
70	126	10.3	5
80	149.1	25.7	14
90	177.4	16.4	5
100	189	0	1

TABLE XXXXI

STATISTICAL MEASURES RELATING TO SHORTHAND ACCURACY SCORES IN THE EXPERIMENTAL GROUP CLASSIFIED ACCORDING TO SHORTHAND DICTATION RATE

Shorthand Dictation-Rate Levels	Statistical Measures of Shorthand Accuracy Scores		
	Mean	S. D.	N.
70	132	0	1
80	168	10.4	6
90	175.6	12.8	7
100	183.1	6	7
110	195	0	1

As shorthand dictation rates increased in both the Control and Experimental classes, shorthand transcription scores (the ability to transcribe isolated shorthand outlines) increased at every dictation-rate level. An analysis of variance was computed for the Control class and for the Experimental class to determine whether at least two of the shorthand transcription means in either or both of the respective classes had a significant difference between them (Table XXXXII).

TABLE XXXXII

ANALYSIS OF VARIANCE OF SHORTHAND TRANSCRIPTION SCORES
OF DICTATION-RATE LEVELS FOR THE CONTROL
AND EXPERIMENTAL CLASSES

Class	Source of Variation	d.f.	Mean Square	F
Control	Between groups	3	2,697.6	5.6
	Within groups	21	478.9	
Experimental	Between groups	4	752.2	7.4
	Within groups	17	101.9	

An F-ratio of 5.6 was found in the Control class and 7.4 in the Experimental class. Both ratios were significant at the .05 level, indicating that within each group at least two of the shorthand transcription means were significantly different.

Whether there were significant differences between more than two of the mean transcription scores, and which means had significant differences, was determined from t-tests (Tables XXXXIII and XXXXIV).

TABLE XXXXIII

THE t-RATIOS OF SHORTHAND TRANSCRIPTION SCORES OF THE VARYING DICTATION-RATE LEVELS IN THE CONTROL CLASS

Shorthand Dictation-Rate Level	Shorthand Dictation-Rate Level		
	90	80	70
100	0.69	1.50	5.57*
90		2.28*	5.94*
80			1.93

*Significant at the .05 level.

TABLE XXXXIV

THE t-RATIOS OF SHORTHAND TRANSCRIPTION SCORES OF THE VARYING DICTATION-RATE LEVELS IN THE EXPERIMENTAL CLASS

Shorthand Dictation-Rate Level	Shorthand Dictation-Rate Level			
	100	90	80	70
110	1.85	1.42	2.41	0**
100		1.42	3.29*	7.99*
90			1.16	3.19*
80				3.21*

*Significant at the .05 level.
**Only one student at 70 words a minute and one student at 110 words a minute.

There were significant differences in the Control group in shorthand transcription indices between the following dictation-rate levels: 100 and 70; 90 and 80; and 90 and 70.

There were significant differences in the Experimental group in shorthand transcription indices between the following dictation-rate levels: 100 and 80; 100 and 70; 90 and 70; and 80 and 70.

Relationship Between Intelligence Quotient Means for Varying Dictation-Rate Levels in the Control and Experimental Classes

Statistical measures relating to intelligence quotient means classified according to shorthand dictation-rate levels for the Control and Experimental groups are presented in Tables XXXXV and XXXXVI.

TABLE XXXXV

STATISTICAL MEASURES RELATING TO INTELLIGENCE QUOTIENT SCORES IN THE CONTROL GROUP CLASSIFIED ACCORDING TO SHORTHAND DICTATION RATE

Shorthand Dictation-Rate Levels	Statistical Measures of Shorthand Accuracy Scores		
	Mean	S. D.	N.
70	119.8	6.1	5
80	112.1	7.5	14
90	110.8	5.2	5
100	118	0	1

TABLE XXXXVI

STATISTICAL MEASURES RELATING TO INTELLIGENCE QUOTIENT SCORES IN THE EXPERIMENTAL GROUP CLASSIFIED ACCORDING TO SHORTHAND DICTATION RATE

Shorthand Dictation-Rate Levels	Statistical Measures of Shorthand Accuracy Scores		
	Mean	S. D.	N.
70	92	0	1
80	112.3	8.4	6
90	114.6	9.7	7
100	117.9	10.4	7
110	116	0	1

An analysis of variance was computed for the Control class and for the Experimental class to determine whether at least two of the intelligence quotient means in either or both of the respective classes differed significantly (Table XXXXVII).

TABLE XXXXVII

ANALYSIS OF VARIANCE OF INTELLIGENCE QUOTIENT SCORES OF DICTATION-RATE LEVELS FOR THE CONTROL AND EXPERIMENTAL CLASSES

Class	Source of Variation	d.f.	Mean Square	F
Control	Between groups	3	93.5	2
	Within groups	21	47	
Experimental	Between groups	4	152.8	1.7
	Within groups	17	92	

An F-ratio of 2 was found in the Control class and 1.7 in the Experimental class. Neither ratio was significant at the .05 level, indicating there was no statistically significant difference in intelligence at the different shorthand dictation-rate levels.

Comparison Between the Control and Experimental Classes in Shorthand Dictation

In the Control class, shorthand dictation rates ranged from 70 words a minute to 100 words a minute:

Dictation-Rate Level	Number of Students
70	5
80	14
90	5
100	1

In the Experimental class, shorthand dictation rates ranged from 70 words a minute to 110 words a minute:

Dictation-Rate Level	Number of Students
70	1
80	6
90	7
100	7
110	1

The median average dictation rate for the Control class was 80 words a minute; for the Experimental class, 90 words a minute. The mean average dictation rate for the Control class was 80.8 words a minute; for the Experimental class, 90.5 words a minute. The critical ratio between the two means was 3.76, which was significant at the .05 level. The Experimental class was significantly superior in shorthand dictation achievement.

Comparison Between the Control and Experimental Classes in Shorthand Accuracy

The accuracy indices for the varying dictation-rate levels in the Control class ranged from 105.2 to 150:

Dictation-Rate Level	Number of Students	Accuracy Index
70	5	105.2
80	14	117
90	5	143
100	1	150

The accuracy indices for the varying dictation-rate levels in the Experimental class ranged from 125 to 176:

Dictation-Rate Level	Number of Students	Accuracy Index
70	1	125
80	6	138.3
90	7	150.1
100	7	163
110	1	176

The mean average accuracy index for the Control group was 121.1; for the Experimental group, 151. The critical ratio between the two means was 4.76, which was significant at the .05 level. The Experimental class was significantly superior in ability to write accurate shorthand outlines.

Comparison Between the Control and Experimental Classes in Shorthand Transcription

The transcription indices for the varying dictation-rate levels in the Control class ranged from 126 to 189:

Dictation-Rate Level	Number of Students	Transcription Index
70	5	126
80	14	149
90	5	177.4
100	1	189

The transcription indices for the varying dictation-rate levels in the Experimental class ranged from 132 to 195:

Dictation-Rate Level	Number of Students	Transcription Index
70	1	132
80	6	168
90	7	175.6
100	7	183.1
110	1	195

The mean average transcription index for the Control group was 151.7; for the Experimental group, 174.8. The critical ratio between the two means was 3.50, which was significant at the .05 level. The Experimental class was significantly superior in transcription ability.

Comparison Between the Winter and Spring Control Class on Shorthand Dictation, Shorthand Accuracy, and Shorthand Transcription and the Winter and Spring Experimental Class on Shorthand Dictation, Shorthand Accuracy and Shorthand Transcription

The Control class had a mean shorthand dictation rate of 66.25 words a minute at the end of the winter quarter and 80.8 words a minute at the end of the spring quarter. The _t_-ratio of 6.80 between the two dictation-rate means was significant at the .05 level. The shorthand accuracy index mean for the Control class increased from 113.5 in the winter quarter to 121.2 during the spring quarter. This increase of 7.7 words was not statistically significant. The shorthand transcription index mean increased from 138.8 during the winter quarter to 151.7 during the spring quarter. The increase in the shorthand transcription index of 12.9 words was not statistically significant.

The Experimental class had a mean shorthand dictation rate of 77 words a minute at the end of the winter quarter and 90.5 words a minute at the end of the spring quarter. The _t_-ratio of 4.59 between the two dictation-rate means was significant at the .05 level. The shorthand accuracy index mean for the Control class increased from 140.6 in the winter quarter to 151 during the spring quarter. This increase of 10.4 words was not statistically significant. The shorthand transcription index mean increased from 163.1 during the winter quarter to 174.8 during the spring quarter. The increase of 11.7 words was not statistically significant.

In both the Control and Experimental classes, the students' ability to write accurate shorthand outlines was apparently established by the first six months of shorthand instruction and appreciable increases in shorthand accuracy did not occur during the latter months of the course.

It would appear that in the Control and Experimental classes, the increase in dictation rates from the winter quarter to the spring quarter was related to the student's ability to write faster the shorthand outlines which he did write rather than to an increased ability to write more shorthand outlines accurately. This conclusion should not imply that an increase in dictation rates would not have been enhanced had the students improved significantly in their ability to write accurate shorthand outlines. The implication of this finding appears to be that the degree of mastery of shorthand theory which the student possesses by the end of his theory course establishes limitations upon his achievement in future shorthand courses.

The ability to write shorthand outlines faster obviously increases dictation rates; however, the ability to transcribe accurately shorthand outlines is dependent upon the accuracy with which the student is able to write the outlines. Increasing the students' dictation rates is therefore predicated upon dual factors: increasing the speed at which the student is capable of writing shorthand outlines and increasing the number of accurate shorthand outlines which the student is able to write.

Chapter Summary

The coefficient of correlation between shorthand accuracy and shorthand dictation for the Control and Experimental groups was .5815 and .6495 respectively; between shorthand accuracy and shorthand transcription, .9402 and .8308; and between shorthand transcription and shorthand dictation, .6616 and .7144. Each of these coefficients of correlation was significant at the .05 level. None of the coefficients of correlation between I. Q. and shorthand dictation, shorthand accuracy, or shorthand transcription was statistically significant for either the Control class or the Experimental class.

As shorthand dictation rates increased in both the Control and Experimental classes, shorthand accuracy scores increased for every dictation-rate level. There were significant differences in the Control group in shorthand accuracy between the following dictation-rate levels: 100 and 70; 90 and 80; and 90 and 70. There were significant differences in the Experimental group in shorthand accuracy between the following dictation-rate levels: 100 and 80; and 100 and 70.

As shorthand dictation rates increased in both the Control and Experimental classes, shorthand transcription scores (the ability to transcribe isolated shorthand outlines) increased at every dictation-rate level. There were significant differences in the Control group in shorthand transcription indices between the following dictation-rate levels: 100 and 70; 90 and 80; and 90 and 70. There were significant differences in the Experimental group in shorthand transcription indices between the following dictation-rate levels: 100 and 80; 100 and 70; 90 and 70; and 80 and 70.

It is interesting that even with the relatively small number of students at each dictation-rate level in both the Control and Experimental classes, significant differences were still obtained.

The mean average accuracy index for the Control group was 121.2; for the Experimental group, 141. The critical ratio between the two means was 4.76, which was significant at the .05 level. The Experimental class was significantly superior in ability to write accurate shorthand outlines.

The mean average transcription index for the Control group was 151.7; for the Experimental group, 174.8. The critical ratio between the two means was 3.50, which was significant at the .05 level. The Experimental class was significantly superior in transcription ability.

The median average dictation rate for the Control class was 80 words a minute; for the Experimental class, 90 words a minute. The mean average dictation rate for the Control class was 80.8 words a minute; for the Experimental class, 90.5 words a minute. The critical ratio between the two means was 3.76, which was significant at the .05 level. The Experimental class was significantly superior in shorthand dictation achievement.

Each of the research hypotheses made in this study could be accepted:

1. There was a significant difference between the Control and Experimental groups on shorthand dictation achievement, with the Experimental group having significantly higher shorthand dictation rates.

2. There was a significant difference between the Control and the Experimental groups on shorthand accuracy, with the Experimental group possessing significantly higher shorthand accuracy scores.

3. There was a significant difference between the Control and the Experimental groups on shorthand transcription, with the Experimental group receiving the highest transcription scores.

There was a significant positive relationship between

1. The ability of the student in the Control group to write accurate shorthand outlines and his achievement in shorthand dictation and the ability of the student in the Experimental group to write accurate shorthand outlines and his achievement in shorthand dictation.

2. The ability of the student in the Control group to write accurate shorthand outlines and his ability to transcribe the outlines and the ability of the student in the Experimental group to write accurate shorthand outlines and his ability to transcribe the outlines.

3. The ability of the student in the Control group to transcribe isolated shorthand outlines and his achievement in shorthand dictation and the ability of the student in the Experimental group to transcribe isolated shorthand outlines and his achievement in shorthand dictation.

There was a nonsignificant relationship between the student's I. Q. in the Control group and his (a) ability to write accurate shorthand outlines, (b) ability to transcribe shorthand outlines, and (c) achievement in shorthand dictation and the student's I. Q. in the Experimental group and his (a) ability to write accurate shorthand outlines, (b) ability to transcribe shorthand outlines, and (c) achievement in shorthand dictation.

There was no significant difference between any of the coefficients of correlation found in the Control group and in the Experimental group on the variables studied.

CHAPTER IX

SUMMARY, FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

Summary

This study was a comparative analysis of the results obtained through the use of two different approaches in the teaching of shorthand. The two approaches were: Approach A, instruction in shorthand utilizing procedures propounded by the authors of Gregg shorthand; and Approach B, instruction in shorthand using procedures recommended by authorities in shorthand methodology which differ significantly from those procedures established by the authors of Gregg shorthand.

The primary purpose of this investigation was to compare the results obtained from contrasting teaching methods as measured by achievement in shorthand dictation. Comparisons were made in the following areas at the end of the winter and spring quarters:

1. Comparison between the Control and the Experimental groups on shorthand dictation achievement.

2. Comparison between the Control and the Experimental groups on shorthand accuracy.

3. Comparison between the Control and the Experimental groups on shorthand transcription.

An analysis was also made to determine the relationship between

1. The ability of the student in the Control group to write accurate shorthand outlines and his achievement in shorthand dictation

and the ability of the student in the Experimental group to write accurate shorthand outlines and his achievement in shorthand dictation.

2. The ability of the student in the Control group to write accurate shorthand outlines and his ability to transcribe the outlines and the ability of the student in the Experimental group to write accurate shorthand outlines and his ability to transcribe the outlines.

3. The ability of the student in the Control group to transcribe isolated shorthand outlines and his achievement in shorthand dictation and the ability of the student in the Experimental group to transcribe isolated shorthand outlines and his achievement in shorthand dictation.

4. The student's I. Q. in the Control group and his (a) ability to write accurate shorthand outlines, (b) ability to transcribe shorthand outlines, and (c) achievement in shorthand dictation and the student's I. Q. in the Experimental group and his (a) ability to write accurate shorthand outlines, (b) ability to transcribe shorthand outlines, and (c) achievement in shorthand dictation.

An analysis was also made to determine whether any of the coefficients of correlation found in the Control group and in the Experimental group on the variables studied were signficantly different.

The study included the following hypotheses:

1. There will be a significant difference between the Control and the Experimental groups on shorthand dictation achievement.

2. There will be a significant difference between the Control and the Experimental groups on shorthand accuracy.

3. There will be a significant difference between the Control and and Experimental groups on shorthand transcription.

It was also hypothesized that there would be a significant positive relationship between

1. The ability of the student in the Control group to write accurate shorthand outlines and his achievement in shorthand dictation and the ability of the student in the Experimental group to write accurate shorthand outlines and his achievement in shorthand dictation.

2. The ability of the student in the Control group to write accurate shorthand outlines and his ability to transcribe the outlines and the ability of the student in the Experimental group to write accurate shorthand outlines and his ability to transcribe the outlines.

3. The ability of the student in the Control group to transcribe isolated shorthand outlines and his achievement in shorthand dictation and the ability of the student in the Experimental group to transcribe isolated shorthand outlines and his achievement in shorthand dictation.

It was hypothesized that there would be a nonsignificant relationship between the student's I. Q. in the Control group and his (a) ability to write accurate shorthand outlines, (b) ability to transcribe shorthand outlines, and (c) achievement in shorthand dictation and the student's I. Q. in the Experimental group and his (a) ability to write accurate shorthand outlines, (b) ability to transcribe shorthand outlines, and (c) achievement in shorthand dictation.

It was also hypothesized that there would be no significant difference between any of the coefficients of correlation found in the Control group and in the Experimental group on the variables studied.

Specialized terms used in this study are defined as follows:

1. Shorthand Theory. As used in this study, shorthand theory refers to the correct application of rules or principles for writing rather than the rote memorization or verbalization of such rules.

2. Shorthand Word-List Test. Each shorthand word-list test consists of 200 words sampled from Silverthorn's High Frequency Business Vocabulary Word List. These 200 words were dictated to the students at the rate of one word every four seconds. After the 200 words were dictated, the students transcribed the list.

3. Shorthand Accuracy Index. The student's shorthand accuracy index represents the highest number of shorthand outlines which he is able to write correctly on any one of the three shorthand word-list tests.

4. Shorthand Transcription Index. The student's shorthand transcription index represents the highest number of shorthand outlines which he is able to transcribe correctly on any one of the three shorthand word-list tests.

5. Unfamiliar, Non-Previewed Dictation. Unfamiliar, non-previewed dictation refers to dictation material taken from copy with which the students are not familiar. No words contained in the copy are written for the students either before or after the dictation.

6. Shorthand Dictation Ability. The highest speed at which a student is able to take a three-minute, unfamiliar, non-previewed dictation and transcribe with no more than three per cent shorthand transcription error represents his shorthand dictation ability.

7. Cold Notes. Cold notes refer to shorthand notes which were written at such a length of time prior to their transcription that the

transcriber would not ordinarily be able to rely on his memory for transcribing the notes but would have to rely on the legibility of the shorthand outlines. In this study, cold notes refer to any shorthand notes which were written at least one week prior to their transcription.

8. Measured Intelligence. Measured intelligence refers to the score obtained from the Otis Test of Mental Maturity.

9. Shorthand Transcription Error. An error which is attributable to the incorrect transcription of a shorthand outline.

10. Non-shorthand Transcription Error. An error in spelling, grammar, or punctuation.

11. Instructional Quarter. A unit of instruction approximately twelve weeks in duration. As used in this study, the fall, winter, and spring quarters refer to the first, second, and third twelve-week unit of instruction of the academic school year.

Two Control classes and two Experimental classes in first-year shorthand at Louisiana Polytechnic Institute participated in the study. There were 40 students in the Experimental group and 39 students in the Control group. One Control class and one Experimental class were each taught during the same period of the day, with Professors Frank M. Busch and Joe M. Pullis each teaching one Control and one Experimental class. No students registering for the beginning shorthand course had received previous instruction in shorthand. When the students first registered for the course, no distinction was made on their schedules as to the particular class they would enter. In order to randomly distribute the shorthand students into four classes, each student was assigned a number. A table of random numbers was then utilized for determining student placement into the Control and Experimental classes. After students had been randomly assigned to each class, the determination of which class was a Control class and which class was an Experimental class was also made by a random selection.

Instruction in shorthand using procedures propounded by the authors of Gregg shorthand was designated as Approach A, and instruction in shorthand using procedures recommended by authorities in shorthand methodology which differ significantly from those procedures established by the authors of Gregg shorthand was designated as Approach B.

Differences in teaching methodology between Approach A, the Control group, and Approach B, the Experimental group, were as follows:

1. In the Experimental classes, students were encouraged to write theoretically accurate shorthand outlines. In the Control classes, emphasis was placed only upon the student's writing of shorthand outlines which could be correctly transcribed.

2. Weekly theory, or word-list, tests consisting of 25 words taken from the current week's vocabulary study were administered to the Experimental classes beginning the sixth week of the fall quarter. No theory tests were given the Control classes.

3. The writing of shorthand was introduced with Assignment Six for the Experimental classes and with Assignment 19 for the Control classes.

4. When practicing familiar dictation, students in the Experimental classes were not allowed to follow the dictation in their texts after the second reading and were encouraged to disregard the text earlier if possible. Students in the Control classes were allowed to keep their textbooks open at all times while taking familiar dictation.

5. In the Experimental classes, writing of graded new-matter dictation began during the fifth week of instruction. No new-matter dictation was given to the Control classes until the completion of shorthand theory.

6. Teachers in the Experimental classes observed daily the shorthand writing habits of their students by direct observation as students wrote. At no time did the teachers of the Control classes observe directly the writing of shorthand by their students.

7. By the fourth week of instruction, students in the Experimental classes wrote their homework twice, once from the connected plate material and once from the English transcript.

8. In the Experimental classes, at least one reading rate was recorded for each student every two weeks. Students in the Control classes were never timed on speed of reading shorthand.

9. Once a week during the winter and spring quarters, students in the Experimental classes were given practice drills in the reading of "cold notes." No time was spent in reading cold notes in the Control classes.

In order to make the desired comparisons between the Control and the Experimental groups, the following procedures for collecting and analyzing data were employed.

Three weekly word-list tests of 200 words each, sampled from Silverthorn's High Frequency Business Vocabulary Word List, were administered to each class during the last three weeks of the winter and spring quarters. Each test was prerecorded on tape in order to maintain a consistency of dictation for each class. After the test had been administered, the students were asked to transcribe their outlines. Both the shorthand outlines and the transcription were graded. The number of shorthand outlines which the student accurately wrote constituted his shorthand accuracy score. The number of shorthand outlines which the student transcribed correctly constituted his shorthand transcription scores.

A weekly series of four unfamiliar, three-minute, non-previewed dictation tests was given to each class during the last four weeks of the winter and spring quarters. The dictation was prerecorded on tape at rates ranging from 60 to 120 words a minute. Students were asked to transcribe the highest rate which they could transcribe with no more than three per cent shorthand transcription error. The highest speed at which a student could transcribe with 97 per cent accuracy constituted his dictation rate.

In order to obtain intelligence quotient scores, the Otis Test of Mental Maturity was administered to each student participating in the study.

At the end of the winter and spring quarters, the student's highest shorthand accuracy score, transcription score, and dictation rate were recorded. The Product-Moment Correlation Coefficient was used to determine the relationship existing in the Control group and the Experimental group between: (a) shorthand accuracy and shorthand dictation, (b) shorthand accuracy and shorthand transcription, (c) shorthand transcription and shorthand dictation, (d) I. Q. and shorthand accuracy, (e) I. Q. and shorthand transcription, and (f) I. Q. and shorthand dictation.

The critical ratio was calculated to test the hypothesis of no difference between the correlations found in the Control group and those found in the Experimental group on the variables studied.

After each population correlation had been obtained for the Control group and for the Experimental group, the hypothesis that the population correlation is zero was tested.

If the correlation was significant at the 5 per cent level, coefficients of determination were computed.

The _t_-test was used to determine if a significant difference existed between the Control group and the Experimental group in (a) shorthand dictation achievement, (b) shorthand accuracy, and (c) shorthand transcription.

The shorthand dictation rates of the Control group and the Experimental group were categorized into dictation-rate levels. The means and standard deviations of the shorthand accuracy index, shorthand transcription index, and I. Q. were calculated for each dictation-rate level. In order to learn whether at least two of these means had a significant difference between them, an analysis of variance was computed and an F-ratio found.

If it was found from the analysis of variance that there was a significant difference between at least two means in either the Control group or the Experimental group, *t*-tests were computed.

Findings

Winter Quarter

1. There was a significant positive relationship between the student's ability to write accurate shorthand outlines and his achievement in shorthand dictation in the Control group ($r = .7706$) and the Experimental group ($r = .7543$).

2. The degree of relationship existing between accuracy and achievement in shorthand dictation was not significantly different between the Control and Experimental groups.

3. The coefficients of determination indicated that approximately 59 per cent of the variation in shorthand dictation achievement was explained by variation in shorthand accuracy in the Control group and that approximately 57 per cent of the variation in shorthand dictation achievement was explained by variation in shorthand accuracy in the Experimental group.

4. There was a significant positive relationship between the student's ability to write accurate shorthand outlines and his ability to transcribe the outlines in the Control group ($r = .9235$) and in the Experimental group ($r = .9280$).

5. The degree of relationship existing between shorthand accuracy and shorthand transcription was not significantly different between the Control and Experimental groups.

6. The coefficients of determination indicated that approximately 85 per cent of the variation in shorthand transcription was explained by variation in shorthand accuracy in the Control group and that approximately 86 per cent of the variation in shorthand transcription was explained by variation in shorthand accuracy in the Experimental group.

7. There was a significant positive relationship between the student's ability to transcribe isolated shorthand outlines and his achievement in shorthand dictation in the Control group (r = .7937) and in the Experimental group (r = .7563).

8. The degree of relationship existing between the student's ability to transcribe isolated shorthand outlines and his achievement in shorthand dictation was not significantly different between the Control and Experimental groups.

9. The coefficients of determination indicated that approximately 63 per cent of the variation in shorthand dictation achievement was explained by variation in the student's ability to transcribe isolated shorthand outlines in the Control group and that approximately 57 per cent of the variation in shorthand dictation achievement was explained by variation in the student's ability to transcribe isolated shorthand outlines in the Experimental group.

10. There was a nonsignificant relationship in the Control group and in the Experimental group between the student's I. Q. and his (a) ability to write accurate shorthand outlines, (b) ability to transcribe isolated shorthand outlines, and (c) achievement in shorthand dictation.

11. The degree of relationship existing between the student's I. Q. and his (a) ability to write accurate shorthand outlines, (b) ability to

transcribe isolated shorthand outlines, and (c) achievement in shorthand dictation did not differ significantly between the Control group and the Experimental group.

12. Significant differences existed in the Control group between shorthand accuracy means at the following dictation-rate levels: 90 and 70; 90 and 60; 80 and 70; 80 and 60; and 70 and 60.

13. In the Control group, achievement in shorthand dictation increased with competency in shorthand accuracy at every speed level with exception of the student who passed a 90 word-a-minute dictation test.

14. Significant differences existed in the Experimental group between shorthand accuracy means at the following dictation-rate levels: 90 and 80; 90 and 70; 90 and 60; 80 and 70; and 80 and 60.

15. In the Experimental group, achievement in shorthand dictation increased with competency in shorthand accuracy at every speed level.

16. Significant differences existed in the Control group between shorthand transcription means at the following dictation-rate levels: 90 and 60; 80 and 70; 80 and 60; and 70 and 60.

17. In the Control group, achievement in shorthand dictation increased with competency in transcribing isolated shorthand outlines at every speed level with exception of the student who passed a 90 word-a-minute take.

18. Significant differences existed in the Experimental group between shorthand transcription means at the following dictation-rate levels: 90 and 70; 90 and 60; 80 and 70; 80 and 60; and 70 and 60.

19. In the Experimental group, achievement in shorthand dictation increased with competency in transcribing isolated shorthand outlines at every speed level.

20. Competency in transcription increased with competency in shorthand accuracy.

21. The mean average accuracy index for the Control group was 113.5; for the Experimental group, 140.6. The critical ratio between the two means was significant at the .05 level. The Experimental class was significantly superior in ability to write accurate shorthand outlines.

22. The mean average transcription index for the Control group was 138.7; for the Experimental group, 163.1. The critical ratio between the two means was 3.89, which was significant at the .05 level. The Experimental class was significantly superior in transcription ability.

23. The median average dictation rate for the Control class was 60 words a minute; for the Experimental class, 80 words a minute. The mean average dictation rate for the Control class was 66.25 words a minute; for the Experimental class, 77 words a minute. The critical ratio between the two means was 4.45, which was significant at the .05 level. The Experimental class was significantly superior in shorthand dictation ability.

Conclusions

As of the completion of the winter quarter, each of the research hypotheses could be accepted.

1. There was a significant difference between the Control and the Experimental groups on shorthand dictation achievement, with the Experimental group having significantly higher dictation rates.

2. There was a significant difference between the Control and the Experimental groups on shorthand accuracy, with the Experimental group possessing significantly higher shorthand accuracy scores.

3. There was a significant difference between the Control and Experimental groups on shorthand transcription ability, with the Experimental group receiving the highest transcription scores.

There were significant positive relationships between

1. The ability of the student in the Control group to write accurate shorthand outlines and his achievement in shorthand dictation and the ability of the student in the Experimental group to write accurate shorthand outlines and his achievement in shorthand dictation.

2. The ability of the student in the Control group to write accurate shorthand outlines and his ability to transcribe the outlines and the ability of the student in the Experimental group to write accurate shorthand outlines and his ability to transcribe the outlines.

3. The ability of the student in the Control group to transcribe isolated shorthand outlines and his achievement in shorthand dictation and the ability of the student in the Experimental group to transcribe isolated shorthand outlines and his achievement in shorthand dictation.

There was a nonsignificant relationship between the student's I. Q. in the Control group and (a) ability to write accurate shorthand outlines, (b) ability to transcribe shorthand outlines, and (c) achievement in shorthand dictation and the student's I. Q. in the Experimental group and his (a) ability to write accurate shorthand outlines, (b) ability to transcribe shorthand outlines, and (c) achievement in shorthand dictation.

There was no significant difference between any of the coefficients of correlation found in the Control group and the Experimental group on the variables studied.

Spring Quarter

1. There was a significant positive relationship between the student's ability to write accurate shorthand outlines and his achievement in shorthand dictation in the Control group (r = .5815) and in the Experimental group (r = .6495).

2. The degree of relationship existing between shorthand accuracy and achievement in shorthand dictation was not significantly different between the Control and Experimental groups.

3. The coefficients of determination indicated that approximately 34 per cent of the variation in shorthand dictation achievement was explained by variation in shorthand accuracy in the Control group and that approximately 42 per cent of variation in shorthand dictation achievement was explained by variation in shorthand accuracy in the Experimental group.

4. There was a significant positive relationship between the student's ability to write accurate shorthand outlines and his ability to transcribe the outlines in the Control group (r = .9402) and in the Experimental group (r = .8308).

5. The degree of relationship existing between shorthand accuracy and shorthand transcription was not significantly different between the Control and Experimental groups.

6. The coefficients of determination indicated that approximately 88 per cent of the variation in shorthand transcription was explained by variation in shorthand accuracy in the Control group and that approximately 69 per cent of the variation in shorthand transcription was explained by variation in shorthand accuracy in the Experimental group.

7. There was a significant positive relationship between the student's ability to transcribe isolated shorthand outlines and his achievement

in shorthand dictation in the Control group (r = .6616) and in the Experimental group (r = .7144).

8. The degree of relationship existing between the student's ability to transcribe isolated shorthand outlines and his achievement in shorthand dictation was not significantly different between the Control and Experimental groups.

9. The coefficients of determination indicated that approximately 43 per cent of the variation in shorthand dictation achievement was explained by variation in the student's ability to transcribe isolated shorthand outlines in the Control group and that approximately 51 per cent of the variation in shorthand dictation achievement was explained by variation in the student's ability to transcribe isolated shorthand outlines in the Experimental group.

10. There was a nonsignificant relationship in the Control group and in the Experimental group between the student's I. Q. and his (a) ability to write accurate shorthand outlines, (b) ability to transcribe isolated shorthand outlines, and (c) achievement in shorthand dictation.

11. The degree of relationship existing between the student's I. Q. and his (a) ability to write accurate shorthand outlines, (b) ability to transcribe isolated shorthand outlines, and (c) achievement in shorthand dictation did not differ significantly between the Control group and the Experimental group.

12. Significant differences existed in the Control group between shorthand accuracy means at the following dictation-rate levels: 100 and 70; 90 and 80; and 90 and 70.

13. In the Control group, achievement in shorthand dictation increased with competency in shorthand accuracy at every speed level.

14. Significant differences existed in the Experimental group between shorthand accuracy means at the following dictation-rate levels: 100 and 80; and 100 and 70.

15. In the Experimental group, achievement in shorthand dictation increased with competency in shorthand accuracy at every speed level.

16. Significant differences existed in the Control group between shorthand transcription means at the following dictation-rate levels: 100 and 70; 90 and 80; and 90 and 70.

17. In the Control group, achievement in shorthand dictation increased with competency in transcribing isolated shorthand outlines at every speed level.

18. Significant differences existed in the Experimental group between shorthand transcription means at the following dictation-rate levels: 100 and 80; 100 and 70; 90 and 70; and 80 and 70.

19. In the Experimental group, achievement in shorthand dictation increased with competency in transcribing isolated shorthand outlines at every speed level.

20. Competency in transcription increased with competency in shorthand accuracy.

21. The mean average accuracy index for the Control group was 121.2; for the Experimental group, 141. The critical ratio between the two means was 4.76, which was significant at the .05 level. The Experimental class was significantly superior in ability to write accurate shorthand outlines.

22. The mean average transcription index for the Control group was 151.7; for the Experimental group, 174.8. The critical ratio between the two means was 3.50; which was significant at the .05 level. The Experimental class was significantly superior in transcription ability.

23. The median average dictation rate for the Control class was 80 words a minute; for the Experimental class, 90 words a minute. The mean average dictation rate for the Control class was 80.8 words a minute; for the Experimental class, 90.5 words a minute. The critical ratio between the two means was 3.76, which was significant at the .05 level. The Experimental class was significantly superior in shorthand dictation achievement.

Conclusions

Each of the research hypotheses made in this study could be accepted.

1. There was a significant difference between the Control and the Experimental groups on shorthand dictation achievement, with the Experimental group having significantly higher dictation rates.

2. There was a significant difference between the Control and the Experimental groups on shorthand accuracy, with the Experimental group possessing significantly higher shorthand accuracy scores.

3. There was a significant difference between the Control and Experimental groups on shorthand transcription ability, with the Experimental group receiving the highest transcription scores.

There were significant positive relationships between

1. The ability of the student in the Control group to write accurate shorthand outlines and his achievement in shorthand dictation and the ability of the student in the Experimental group to write accurate shorthand outlines and his achievement in shorthand dictation.

2. The ability of the student in the Control group to write accurate shorthand outlines and his ability to transcribe the outlines and the ability of the student in the Experimental group to write accurate shorthand outlines and his ability to transcribe the outlines.

3. The ability of the student in the Control group to transcribe isolated shorthand outlines and his achievement in shorthand dictation and the ability of the student in the Experimental group to transcribe isolated shorthand outlines and his achievement in shorthand dictation.

There was a nonsignificant relationship between the student's I. Q.[1] in the Control group and his (a) ability to write accurate shorthand outlines, (b) ability to transcribe shorthand outlines, and (c) achievement in shorthand dictation and the student's I. Q. in the Experimental group and his (a) ability to write accurate shorthand outlines, (b) ability to transcribe shorthand outlines, and (c) achievement in shorthand dictation.

There was no significant difference between any of the coefficients of correlation found in the Control group and the Experimental group on the variables studied.

Recommendations

As the student's mastery of shorthand theory increases, achievement in shorthand dictation is enhanced. While it is true that the end result of shorthand dictation is the correct transcription of shorthand outlines, competency, or lack of competency, in the writing of accurate shorthand outlines has a significant influence upon whether the shorthand outlines will or will not be correctly transcribed.

Memorization or verbalization of rules is certainly not suggested; however, teaching methods and procedures utilized by the classroom teacher should be designed so as to encourage as great a degree of mastery of the shorthand system as is possible.

Apparently, the teaching procedures recommended by the authors of the Gregg shorthand texts do not promote an understanding of shorthand theory which is necessary for best results. Present practices in the teaching of shorthand should be critically questioned.

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[1] The reader should keep in mind that the variability of the students' intelligence quotients was somewhat restricted. The mean average I. Q. for the control classes was 114, and the standard deviation was 7. The mean average I. Q. for the experimental classes was 114, and the standard deviation was 10. Had the students been more heterogeneous in intelligence, the possibility of obtaining larger coefficients of correlation would have been greater.

When considering the high degree of relationship existing between competency in shorthand accuracy and achievement in shorthand dictation, it is apparent that the premises upon which the Gregg authors have based their teaching procedures have not been well founded. Shorthand students need much more than a 70 per cent knowledge of the brief forms or a 60 per cent knowledge of the abbreviating devices of the shorthand system.

Since the proficiency attained by students is directly related to the teaching procedures utilized in the classroom, teaching methods which are designed to promote mastery of the shorthand system are recommended rather than those teaching procedures currently propounded by the authors of Gregg shorthand.

PART THREE

PART THREE

AN ANALYSIS OF THE EFFECT OF SELECTED VARIABLES UPON ACHIEVEMENT IN SHORTHAND

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CHAPTER X

THE EFFECT OF VARYING THE DURATION OF SHORTHAND DICTATION UPON THE STUDENT'S ABILITY TO TRANSCRIBE

There is general agreement among shorthand teachers that two of the major factors affecting the student's achievement in dictation are the rate and the duration of the dictation. Most teachers employ dictation tests of the same duration and provide for individual differences by varying the rates at which the tests are dictated. While five-minute dictation tests have prevailed in the past, an increasing percentage of shorthand teachers is presently using three-minute tests, partially because of the time problem in the classroom and partially because studies have indicated that rarely does an employer dictate uninterruptedly for longer than three minutes.

Shorthand teachers know that students are able to take dictation at higher rates of speed for a short period of time. When comparing achievement on three-minute and five-minute dictation tests, however, the question arises as to the relationship of achievement in shorthand dictation between the two lengths of tests.

Statement of the Problem

This problem was an analysis of the effect of varying the duration of shorthand dictation from three to five minutes upon the student's ability to transcribe.

Background of the Study

Seventy-one students enrolled in second-semester college shorthand participated in the study. All but three of the students enrolled in the course were females. Forty-four of the students were majoring in business education, fifteen were majoring in office administration, and twelve were majoring in fields other than business education or office administration. The age range of the students was from seventeen to twenty-four. Fifty-one of the students were freshmen, fourteen were sophomores, five were juniors, and one was a senior. Upon entering the course, the students ranged in dictation ability from 60 words a minute to 80 words a minute as measured by three-minute dictation tests requiring a 97 per cent degree of accuracy.

Six of the students had completed two years of shorthand in high school before entering the course; thirteen had completed one year of high school shorthand; thirty-one had completed one year of high school shorthand and one semester of college shorthand; and twenty-one had completed one semester of college shorthand. Students having previous instruction in shorthand were given placement tests upon entering the collegiate shorthand program to determine the course level of instruction at which they should enter.

It is noteworthy that of the forty-four students who had completed one year of shorthand in high school before entering college, only thirteen were able to meet the advance-placement standards for the first-semester course in shorthand. It is also interesting that of the seventy-one second-semester shorthand students, twenty-one had never studied shorthand before entering college.

The minimum speed requirement necessary to enter the second-semester shorthand course was 60 words a minute on three-minute, unpreviewed, unfamiliar dictation with no more than 3 per cent error. The minimum speed requirement for completing the second-semester shorthand course was 80 words a minute on five-minute, unpreviewed, unfamiliar dictation with no more than 3 per cent error.

The 3 per cent error allowance consisted of shorthand and non-shorthand errors and could have been any combination of the two types of errors. For the course requirements, two tests at a given speed were passed before credit was given for that particular speed.

The shorthand classes met daily for a period of fifty minutes. Supervised labs were provided in the afternoon, and students were encouraged to attend these labs, especially if their shorthand skill development was not progressing as it should.

Procedures for Collecting and Treating Data

Once a week during the last six weeks of the semester the shorthand students were given prerecorded three-minute dictation tests at rates ranging from 80 to 140 words a minute. The students were required to meet one additional lab session each week where prerecorded five-minute dictation tests were given at speeds ranging from 60 to 140 words a minute. On both the three- and five-minute dictation tests, the shorthand students were asked to transcribe the highest rate which they could with no more than 3 per cent error. The highest rate which a student could transcribe with 97 per cent accuracy on the three- and five-minute tests constituted his dictation rate for that particular length of test.

The dictation material was graded in order that each take of the same length would have the same proportion and type of English and grammatical problems. Other than the regulation of syllabic intensity, no attempt was made to equate the difficulty of the words in the dictation material from one take to another.

After the students had transcribed the tests, an error analysis was made to determine the types and distribution of errors committed.

Presentation and Analysis of Data

The range of dictation rates on the three-minute takes for the seventy-one students was from 80 words a minute to 130 words a minute. Two students passed a three-minute dictation test at 130 words a minute; none at 120; twenty-one at 110; twenty-four at 100; twenty-one at 90; and three at 80. The average dictation rate (median and mean) for the three-minute test was 100 words a minute.

TABLE XXXXVIII

DISTRIBUTION OF STUDENTS ON THREE-MINUTE DICTATION RATE LEVELS

Number of Students	Speed of Dictation
2	130
0	120
21	110
23	100
22	90
3	80
0	70

On the five-minute takes, the range was from 70 words a minute to 120 words a minute. One student passed a five-minute dictation test at 120 words a minute; three at 110; one at 100; twenty at 90; thirty-nine at 80; and seven at 70. The median average dictation rate was 80 words a minute; the mean average was 84 words a minute.

TABLE XXXXIX

DISTRIBUTION OF STUDENTS ON FIVE-MINUTE DICTATION RATE LEVELS

Number of Students	Speed of Dictation
0	130
1	120
3	110
1	100
20	90
39	80
7	70

It is obvious that no student could have had a dictation rate of 84 words a minute; and to this extent, the mean average is a meaningless figure when presented in isolation. However, when one also considers the variability of the sample, the mean average may be used to yield an estimation of the significance of the difference between the sample averages.

The difference in achievement on the three- and five-minute takes was significant at better than the .01 level, indicating that student achievement was appreciably affected by increasing the duration of the dictation from three to five minutes, The coefficient of correlation, however, between achievement on three- and five-minute dictation tests was .7129.

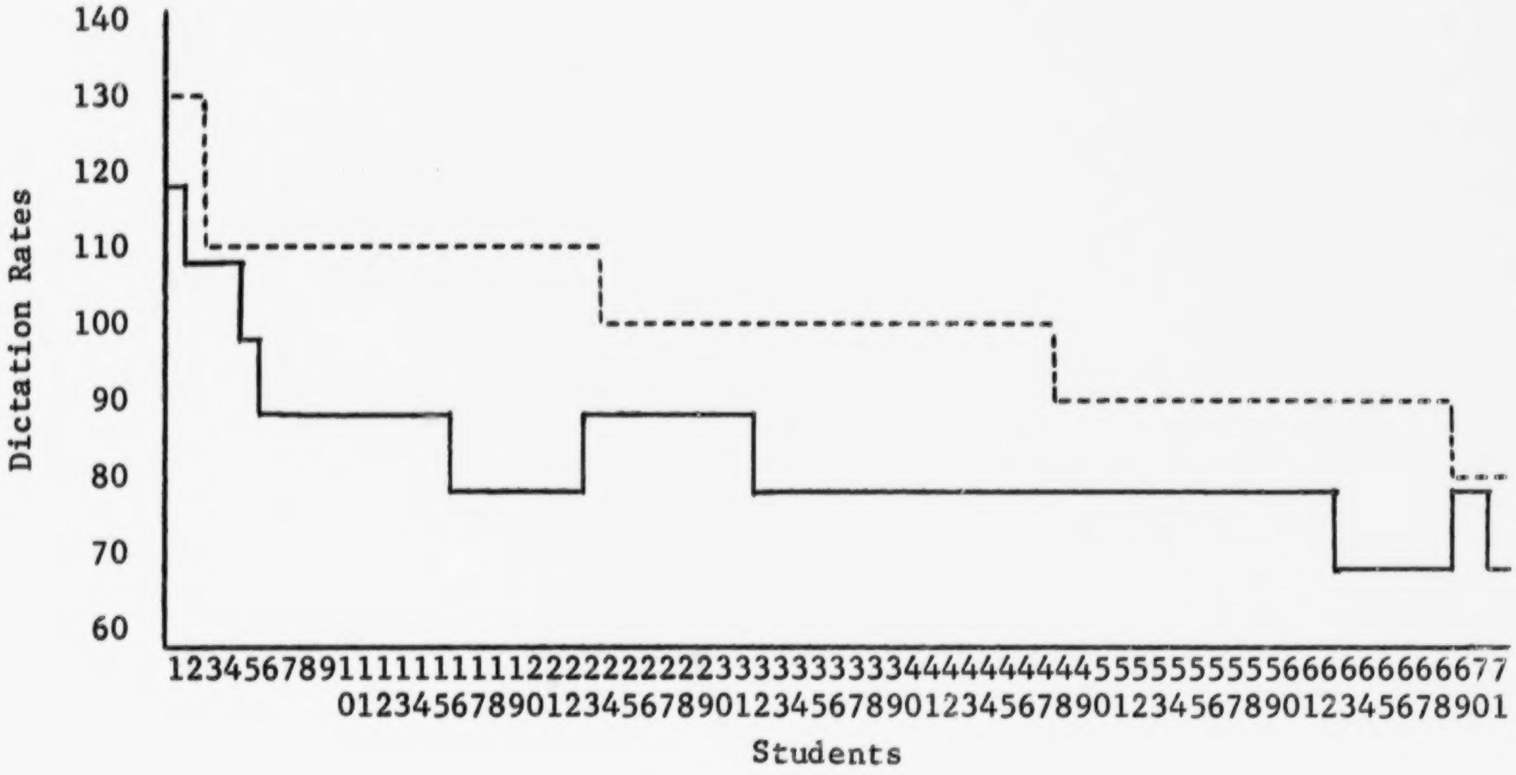

Fig. 4--Shorthand skill levels on three- and five-minute takes for seventy-one students.

-----*3-minute takes*

_____5-minute takes

No student in the study achieved his highest dictation rate on a five-minute test. Four students did as well on a five-minute test as they did on a three-minute test; twenty-seven students had a difference of 10 words a minute between the two lengths of tests; thirty-three students had a difference of 20 words a minute; and seven students had a difference of 30 words a minute.

TABLE L

DISTRIBUTION OF DIFFERENCES IN WORDS A MINUTE BETWEEN THREE- AND FIVE-MINUTE TAKES

Difference in Words	Number of Students
0	4
10	27
20	33
30	7

The median average difference between the two lengths of dictation tests was 20 words a minute; the mean average difference was 16 words a minute.

Of the best five-minute dictation test passed by each student, 45 per cent of the errors were committed during the last two minutes of the test. Had there been an even distribution of errors, one would expect that 40 per cent of the errors would have been committed during this interval. On the five-minute dictation tests which were not passed, however, a high concentration of errors was committed during the last two minutes of the test. Whether the students' skills were not sufficient to maintain the dictation rate for the entire five minutes, whether the students were transcribing more accurately on the first part of the test by relying heavily on memory, or whether the students knew they had not passed the test and became discouraged during the transcription of the latter stages of the test could not be determined. A combination of these factors could very well have affected the increase in the percentage of errors committed during the last two minutes of the five-minute tests which were not passed.

Of the total errors committed on the best three-minute take passed by each student, 82 per cent of the errors were shorthand and 18 per cent nonshorthand; on the best five-minute take, 76 per cent of the errors were shorthand 24 per cent nonshorthand. Seventy-eight per cent of the errors committed during the first three minutes of the five-minute take were shorthand and 22 per cent nonshorthand.

TABLE LI

PER CENT OF SHORTHAND AND NONSHORTHAND ERRORS ON THE THREE- AND FIVE-MINUTE TAKES

Type of Error	Dictation Intervals		
	Three-Minute Take	First Three Minutes of Five-Minute Take	Five-Minute Take
Shorthand	82%	78%	76%
Nonshorthand	18%	22%	24%
Total	100%	100%	100%

Of the three- and five-minute takes which were not passed, the failure to pass the take appeared to rest primarily on the student's inability to read his shorthand notes and not on his inability to handle correctly the mechanics of English usage.

Conclusion

A significant coefficient of correlation exists between achievement on three-minute dictation tests and achievement on five-minute dictation tests. For the most part, the students who achieve the highest dictation rates on three-minute tests also achieve the highest dictation rates on five-minute tests. The dictation rates achieved on the two lengths of tests, however, are not comparable. A significant difference does exist between the shorthand student's ability to take dictation for a three-minute duration and his ability to take dictation for a five-minute duration. It appears there may be a much greater difference in student achievement between three- and five-minute dictation tests than many shorthand instructors have suspected.

It is apparent that as an indicator of achievement, the speed of dictation at which a shorthand student is able to write may be a very unreliable measure unless other variables such as the duration of the dictation, the accuracy required in the transcription, the type of material used for testing, and the frequency at which the level of achievement can be attained are also known.

CHAPTER XI

THE EFFECT OF DEFERRED TRANSCRIPTION UPON STUDENTS' ACHIEVEMENT IN SHORTHAND DICTATION

The effect of deferred transcription upon students' achievement in shorthand dictation has rarely been studied. If shorthand outlines which can be read within the hour of the dictation can be read at any time, there would be no need in providing for deferred transcription drills. If, however, students do have difficulty in reading deferred transcription, or "cold notes,"[1] consideration should be given to the development of this skill.

Perhaps the claim to the effect that there are no such things as "cold notes" in Gregg shorthand has contributed to the lack of study in this area.

> In the true sense of the word, there are no such things as cold notes in Gregg shorthand.[2]
>
> Ordinarily, notes that can be read today can be read tomorrow or can be read a thousand years from now. Perhaps it should be said conversely that notes that cannot be read next year cannot be read today.[3]

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[1] "Cold notes" refer to shorthand notes which were written at such a length of time prior to their transcription that the transcriber would not ordinarily be able to rely on his memory for transcribing the notes but rather would have to rely upon the legibility of the shorthand outlines. In this study, "cold notes" refer to shorthand notes which were written at least one week prior to their transcription.

[2] Louis A. Leslie, Methods of Teaching Gregg Shorthand (New York, 1953), p. 267.

[3] Louis A. Leslie, Methods of Teaching Transcription (New York, 1949), p. 160.

While shorthand teachers agree that notes which cannot be read today cannot be read tomorrow, many question the validity of the statement that a student can transcribe tomorrow any notes he is capable of transcribing today.

Statement of the Problem

This problem was an analysis of the effect of deferred transcription upon students' achievement in shorthand dictation.

Purpose of the Study

The purpose of this study was to determine whether shorthand students could transcribe as accurately from shorthand notes written one week prior to their transcription as they could from notes written on the day of their transcription.

Procedures for Collecting and Treating Data

Two classes of forty-nine students enrolled in the first transcription course of advanced shorthand participated in the study. Upon entering the advanced course, all students were capable of taking dictation for a five-minute duration at a minimum rate of 90 words a minute on new, unpreviewed material with no more than 3 per cent error.

During the fifteenth week of the semester, the students were given a prerecorded five-minute dictation test at 80 words a minute, a rate well within the control range of the class. The students were asked to transcribe the test, and both their transcriptions and shorthand notes were collected. One week later the shorthand notes were passed back to the students for the second transcription. A comparison was then made between the accuracy of the first and the second transcripts.

Presentation and Analysis of Data

Table LII presents an analysis of the errors committed on the two transcripts.

TABLE LII

AVERAGE NUMBER OF SHORTHAND AND NON-SHORTHAND TRANSCRIPTION ERRORS COMMITTED ON TWO TRANSCRIPTIONS OF IDENTICAL SHORTHAND NOTES

Dictation Interval	Shorthand Transcription Errors		Dictation Interval	Non-Shorthand Transcription Errors	
	First Transcription	Second Transcription		First Transcription	Second Transcription
First Minute	.95	1.25	First Minute	1.65	1.90
Second Minute	.75	1.15	Second Minute	.30	.15
Third Minute	1.05	1.75	Third Minute	1.25	1.55
Fourth Minute	1.25	2.25	Fourth Minute	.65	.80
Fifth Minute	1.00	1.40	Fifth Minute	.90	1.05
Total Errors	5.00	7.80	Total Errors	4.75	5.45

The average number of non-shorthand transcription errors--errors due to spelling, punctuation, grammar, etc.--increased from 4.75 errors on the first transcription to 5.45 on the second. This increase of .7 of an error was not statistically significant.

However, the average number of shorthand transcription errors increased from 5 on the first transcription to 7.8 on the second. The difference in shorthand transcription errors committed between the two transcripts was significant at the .05 level.

Total errors committed on the first and second transcriptions increased from an average of 9.75 to 13.25, a 36 per cent increase. This increase was significant at the .01 level. This difference would indicate that shorthand notes do become "cold" and cannot be read as accurately on later dates as they can on the date of the original dictation.

It should be noted that the students had an advantage in having first transcribed their notes on the date of the original dictation. The students had also been instructed before the dictation was given that they would have the opportunity to transcribe their notes again in one week. Notwithstanding, significantly more shorthand outlines were correctly transcribed immediately after the dictation than were transcribed from the same shorthand notes one week later. It would appear that memory is a greater aid and influence in transcription than some have proposed.

Conclusion

Apparently shorthand students do experience difficulty in reading "cold notes." Students who can read or transcribe shorthand notes during the hour the dictation was given do not necessarily possess the ability to read or transcribe the same notes a few days later with the same degree of accuracy.

The shorthand instructor should not assume that stenographers or secretaries are never required to read or transcribe notes which have been written on earlier dates and that students will, therefore, have no need to possess the ability to read "cold notes." Such a need does exist, and consideration should be given to the development of this ability. Since many shorthand teachers have accepted the proposition that "cold notes" are nonexistent in Gregg shorthand, their students have not been provided with the opportunity of reading or transcribing notes which were written on prior dates. It would appear that for the benefit of these students, some class time could profitably be spent in this particular area of shorthand skill development.

CHAPTER XII

THE RELATIONSHIP BETWEEN THE ACCURACY OF SHORTHAND NOTES AND THE CORRECTNESS OF TRANSCRIPTS RESULTING FROM NON-DEFERRED AND DEFERRED TRANSCRIPTION

While it has been established that there is a significant positive relationship between the shorthand student's ability to write accurately isolated shorthand outlines and his achievement in shorthand dictation, a need does exist to analyze the notes of terminal collegiate-level shorthand students to determine if there is a relationship between the accuracy of shorthand notes recorded from connected-matter dictation and the correctness of the transcripts resulting from those notes.

Iannizzi conducted a study utilizing high school students in which she gave dictation tests at 40 words a minute to first-year shorthand students studying Diamond Jubilee Gregg Shorthand or Gregg Shorthand Simplified and at 70 words a minute to second-year shorthand students studying Diamond Jubilee Gregg Shorthand or Gregg Shorthand Simplified. The purpose of the Iannizzi study was to determine relationships of transcription errors to shorthand errors.

With the second-year students studying Diamond Jubilee Gregg Shorthand, the following data were obtained:[1]

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[1] Elizabeth Iannizzi, "Transcription and Shorthand Errors Among Elementary and Advanced High School Writers of Simplified and Diamond Jubilee Gregg Shorthand," Unpublished Ph.D. dissertation, New York University, 1967, p. 71.

Total outlines written	8,960
Outlines written correctly	7,854
Correct outlines transcribed correctly	7,673
Correct outlines transcribed incorrectly	181
Outlines written incorrectly	1,106
Incorrect outlines transcribed correctly	929
Incorrect outlines transcribed incorrectly	177

Based upon these data, one could make the following statements concerning the group studied:

1. Of the total outlines written, 88 per cent were written correctly and 12 per cent were incorrectly written.

2. The shorthand transcription error rate, which would not include errors in spelling, punctuation, and grammar, etc., was 4 per cent.

3. Of the total shorthand transcription errors committed, 50 per cent were from correctly written shorthand outlines and 50 per cent were from incorrectly written outlines.

4. Of the total correctly written shorthand outlines, 2.3 per cent were incorrectly transcribed.

5. Of the total incorrectly written shorthand outlines, 16 per cent were incorrectly transcribed.

6. Fifty per cent of the total shorthand transcription errors came from only 12 per cent of the notes--the incorrectly written shorthand outlines.

7. An incorrectly written outline was 7 times as likely to be incorrectly transcribed as was a correctly written outline.

Statement of the Problem

This problem was an analysis of the relationship between the accuracy of shorthand notes written by collegiate-level shorthand students and the correctness of the transcripts resulting from non-deferred and deferred transcription.

Purposes of the Study

The purposes of this study were twofold: (1) to determine whether accurately written shorthand outlines were more accurately transcribed than inaccurately written outlines, and (2) to determine if the transcription of "cold notes" was influenced by the accuracy of shorthand outlines.

Procedures for Collecting and Treating Data

In order to make the desired analyses, the shorthand outlines from forty-nine students' shorthand transcripts of a five-minute dictation test at 80 words a minute were graded. The forty-nine students were enrolled in the first transcription course of advanced shorthand. Before entering the course, each student was capable of taking dictation for a five-minute duration with no more than 3 per cent error at a minimum rate of 90 words a minute on new, unpreviewed material.

During the fifteenth week of the semester, the students were given a prerecorded five-minute dictation test at 80 words a minute. By the fifteenth week of the course, 80 words a minute was well within the control writing level of the class. The shorthand notes were transcribed twice by each student, immediately after receiving the dictation and again one week later. The students' shorthand notes and non-deferred and deferred transcriptions were graded, and comparisons were then made concerning the influence of shorthand accuracy upon students' achievement in non-deferred and deferred transcription.[2]

Table LIII presents a description of the shorthand dictation material used in the study.

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[2] Non-deferred transcription refers to a transcription of shorthand notes which occurs on the same date of the dictation. Deferred transcription, sometimes termed "cold notes," refers to a transcription of shorthand notes which does not occur until a date later than that of the dictation.

TABLE LIII

COMPOSITION OF THE FIVE-MINUTE, EIGHTY-WORD-A-MINUTE DICTATION MATERIAL

Minute	Words	Syllables	Syllabic Intensity	Brief Forms*	Percent Brief Forms	Common Words**	Percent Common Words
1	84	112	1.33	40	47.62	78	92.86
2	72	110	1.53	28	38.89	68	94.44
3	81	111	1.37	35	43.21	75	92.59
4	79	111	1.41	33	41.77	74	93.67
5	84	114	1.36	36	42.86	81	96.43
Total	400	558	1.4***	172	43***	376	94***

*Brief Forms and Brief Form Derivatives

**Occurring within the First 1,500 Most Frequently Used Words from Silverthorn's High-Frequency Business Vocabulary

***Weighted Average or Weighted Percent

The syllabic intensity of the material was 1.4. Forty-three per cent of the words were brief forms and 94 per cent of the words occurred within the first 1,500 most frequently used words as measured by Silverthorn's High-Frequency Business Vocabulary. Although not indicated by the table, it is noteworthy that 50 per cent of the words in the five-minute dictation came from the first 100 most frequently used words in Silverthorn's list. The dictation material should not have posed undue difficulty for the shorthand students.

Presentation and Analysis of Data

After grading the shorthand outlines and transcripts of the forty-nine students, the following data were obtained concerning the shorthand notes and the non-deferred transcription from those notes:

Total outlines written	19,600
Outlines written correctly	18,728
Correct outlines transcribed correctly	18,649
Correct outlines transcribed incorrectly	79
Outlines written incorrectly	872
Incorrect outlines transcribed correctly	706
Incorrect outlines transcribed incorrectly	166

In drawing parallel conclusions between achievement of second-year high school students taking dictation at 70 words a minute and collegiate-level shorthand students taking dictation at 80 words a minute, one can make the following statements concerning the college-level students on non-deferred transcription:

1. Of the total outlines written, 95.55 per cent were correctly written and 4.45 per cent were incorrectly written.

2. The shorthand transcription error rate, which excludes errors in spelling, punctuation, and grammar, was 1.25 per cent.

3. Of the total shorthand transcription errors committed, 32 per cent were from correctly written shorthand outlines and 68 per cent were from incorrectly written outlines.

4. Of the total correctly written shorthand outlines, 0.42 per cent were incorrectly transcribed.

5. Of the total incorrectly written shorthand outlines, 19.11 per cent were incorrectly transcribed.

6. Sixty-eight per cent of the total shorthand transcription errors came from only 4.45 per cent of the notes--the incorrectly written shorthand outlines.

7. An incorrectly written outline was more than 40 times as likely to be incorrectly transcribed as was a correctly written outline.

Table LIV presents a profile of the students' shorthand dictation notes and the non-deferred transcription from those notes.

TABLE LIV

AVERAGE NUMBER* OF CORRECTLY AND INCORRECTLY WRITTEN SHORTHAND OUTLINES AND THE ACCURACY OF THE RESULTING TRANSCRIPTS FROM NON-DEFRRED TRANSCRIPTION

Minute	Words	Outlines Correctly Written			Outlines Incorrectly Written		
		Number	Correctly Transcribed	Incorrectly Transcribed	Number	Correctly Transcribed	Incorrectly Transcribed
1	84	80.6	80.15	.45	3.4	2.9	.5
2	72	69.0	68.85	.15	3.0	2.4	.6
3	81	77.9	77.55	.35	3.1	2.4	.7
4	79	73.8	73.45	.35	5.2	4.3	.9
5	84	80.9	80.60	.30	3.1	2.4	.7
Total	400	382.2	380.60	1.60	17.8	14.4	3.4

*Mean Average

Each student's shorthand notes were again transcribed one week after the date of the original dictation. The transcription of these "cold notes" was then analyzed in terms of errors committed from correctly and incorrectly written shorthand outlines.

The distribution of errors on the deferred transcription was as follows:

Total outlines written	19,600
Outlines written correctly	18,728
Correct outlines transcribed correctly	18,635
Correct outlines transcribed incorrectly	93
Outlines written incorrectly	872
Incorrect outlines transcribed correctly	583
Incorrect outlines transcribed incorrectly	289

Based upon the students' achievement on deferred transcription, the following statements can be made:

1. The per cent of shorthand outlines written incorrectly and also transcribed incorrectly increased from 19 per cent on non-deferred transcription to 33 per cent on deferred transcription.

2. The per cent of shorthand outlines written correctly but transcribed incorrectly increased from 0.42 per cent on non-deferred transcription to 0.50 per cent on deferred transcription.

3. When the transcription of dictated material was deferred by one week, a correctly written outline was more than 60 times as likely to be correctly transcribed as was an incorrectly written outline.

Table LV presents a profile of the students' shorthand dictation notes and the deferred transcription from those notes.

TABLE LV

AVERAGE NUMBER OF CORRECTLY AND INCORRECTLY WRITTEN SHORTHAND OUTLINES AND THE ACCURACY OF THE RESUTLING TRANSCRIPTS FROM DEFERRED TRANSCRIPTION

Minute	Words	Outlines Correctly Written			Outlines Incorrectly Written		
		Number	Correctly Transcribed	Incorrectly Transcribed	Number	Correctly Transcribed	Incorrectly Transcribed
1	84	80.6	80.15	.45	3.4	2.6	.8
2	72	69.0	68.75	.25	3.0	2.1	.9
3	81	77.9	77.45	.45	3.1	1.8	1.3
4	79	73.8	73.45	.35	5.2	3.3	1.9
5	84	80.9	80.50	.40	3.1	2.1	1.0
Total	400	382.2	380.30	1.9	17.8	11.9	5.9

*Mean Average

Chi square was computed to test the hypothesis that accuracy of the shorthand transcript and accuracy of the shorthand notes were independent of each other. The value of chi square was significant at the .001 level, indicating that the accuracy of the transcript was dependent upon the accuracy of the shorthand outlines.

A coefficient of correlation of .72 was found between the accuracy of the students' shorthand outlines and the correctness of the transcripts with non-deferred transcription. When the transcription was deferred by one week, the coefficient of correlation between the accuracy of the students' shorthand outlines and the correctness of the transcripts increased to .81.[3]

When comparing errors between the deferred and non-deferred transcriptions, it can be observed that from the 18,728 correctly written outlines, an increase of 14 errors was committed after the notes had become "cold." From the 872 incorrectly written outlines, an increase of 123 errors was committed after the notes had become "cold."

Conclusion

The student's ability to write accurate shorthand outlines greatly enhances the likelihood of his correctly transcribing his shorthand notes, regardless of whether the notes are transcribed immediately after the dictation or after they have become "cold."

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[3] In the four groups of high school students which Iannizzi studied, coefficients of correlation of .64, .57, .65 and .82 were obtained between the accuracy of the students' shorthand outlines and the correctness of the transcripts on non-deferred transcription. *Ibid.*, p. 82.

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APPENDIX

APPENDIX A

Appendix A presents Tables LVI through CXVIII which indicate the students' shorthand accuracy scores, shorthand transcription scores, shorthand dictation rates, and intelligence quotient scores, categorized according to each variable.

TABLE LVI

SHORTHAND DICTATION RATE, SHORTHAND ACCURACY INDEX, AND SHORTHAND TRANSCRIPTION INDEX FOR ONE HUNDRED THIRTY-FIVE STUDENTS

Shorthand Dictation Rate	Shorthand Accuracy Index	Shorthand Transcription Index
130	186	190
130	180	196
130	180	193
130	175	193
130	169	186
120	172	190
120	172	187
120	170	187
120	169	184
120	166	185
120	163	179
120	156	182
120	151	156
120	150	184
110	184	191
110	182	193
110	179	191
110	177	192
110	176	193
110	176	192

TABLE LVI--Continued

Shorthand Dictation Rate	Shorthand Accuracy Index	Shorthand Transcription Index
110	176	191
110	175	194
110	174	191
110	174	189
110	174	183
110	173	189
110	173	186
110	173	184
110	173	179
110	172	190
110	170	193
110	168	189
110	168	177
110	164	188
110	164	174
110	163	187
110	162	184
110	161	174
110	160	191
110	160	187

TABLE LVI--Continued

Shorthand Dictation Rate	Shorthand Accuracy Index	Shorthand Transcription Index
110	157	185
110	157	178
110	156	189
110	156	184
110	155	179
110	152	184
110	150	191
110	149	168
110	147	186
110	147	181
110	147	175
110	146	182
110	143	177
110	143	169
110	139	157
110	138	158
110	131	160
110	128	179
110	119	150
100	179	185

TABLE LVI--Continued

Shorthand Dictation Rate	Shorthand Accuracy Index	Shorthand Transcription Index
100	178	188
100	175	188
100	174	191
100	166	184
100	164	179
100	163	180
100	161	187
100	160	186
100	160	186
100	156	176
100	153	184
100	150	181
100	149	186
100	149	155
100	149	151
100	144	155
100	140	170
100	139	171
100	136	171
100	133	162

TABLE LVI--Continued

Shorthand Dictation Rate	Shorthand Accuracy Index	Shorthand Transcription Index
100	132	148
100	122	154
100	119	169
90	171	194
90	165	182
90	160	165
90	159	171
90	157	184
90	154	176
90	145	184
90	144	166
90	140	159
90	134	153
90	132	180
90	129	171
90	125	164
90	125	150
90	122	177
90	113	142
90	110	137

TABLE LVI--Continued

Shorthand Dictation Rate	Shorthand Accuracy Index	Shorthand Transcription Index
90	97	159
80	160	192
80	148	182
80	145	182
80	143	167
80	136	162
80	132	178
80	119	141
70	135	158
70	125	154
70	119	157
70	109	161
70	108	125
70	103	138
70	103	131
70	98	151
70	88	155
60	127	145
60	123	143
60	112	137

TABLE LVI--Continued

Shorthand Dictation Rate	Shorthand Accuracy Index	Shorthand Transcription Index
60	106	129
60	105	129
60	102	120
60	100	139
60	97	118
60	87	126
60	73	90
60	59	80
50	82	121
50	77	90
50	73	112
50	50	86
50	42	70
50	36	55
50	29	62

TABLE LVII

SHORTHAND DICTATION RATE LISTED ACCORDING TO SHORTHAND ACCURACY INDEX

Shorthand Accuracy Index	Shorthand Dictation Rate	Shorthand Accuracy Index	Shorthand Dictation Rate	Shorthand Accuracy Index	Shorthand Dictation Rate
186	130	172	120	160	110
184	110	172	120	160	100
182	110	172	110	160	100
180	130	171	90	160	90
180	130	170	120	160	80
179	110	170	110	159	90
179	100	169	130	157	110
178	100	169	120	157	110
177	110	168	110	157	90
176	110	168	110	156	120
176	110	166	120	156	110
176	110	166	100	156	110
175	130	165	90	156	100
175	110	164	110	155	110
175	100	164	110	154	90
174	110	164	100	153	100
174	110	163	120	152	110
174	110	163	110	151	120
174	100	163	100	150	120
173	110	162	110	150	110
173	110	161	110	150	100
173	110	161	100	149	110
173	110	160	110	149	100

TABLE LVII--Continued

Shorthand Accuracy Index	Shorthand Dictation Rate	Shorthand Accuracy Index	Shorthand Dictation Rate	Shorthand Accuracy Index	Shorthand Dictation Rate
149	100	134	90	109	70
149	100	133	100	108	70
148	80	132	100	106	60
147	110	132	90	105	60
147	110	132	80	103	70
146	110	129	90	102	60
145	90	128	110	100	60
145	80	127	60	98	70
144	100	126	70	97	90
144	90	125	90	97	60
143	110	125	90	88	70
143	110	123	60	87	60
143	80	122	100	82	50
140	100	122	90	77	50
140	90	119	110	73	60
139	110	119	100	73	50
139	100	119	80	59	60
138	110	119	70	50	50
136	100	113	90	42	50
136	80	112	60	36	50
135	70	110	90	29	50

TABLE LVIII

SHORTHAND ACCURACY INDEX LISTED ACCORDING TO SHORTHAND DICTATION RATE

Shorthand Dictation Rate	Shorthand Accuracy Index	Shorthand Dictation Rate	Shorthand Accuracy Index	Shorthand Dictation Rate	Shorthand Accuracy Index
130	186	110	174	110	150
130	180	110	174	110	149
130	180	110	174	110	147
130	175	110	173	110	147
130	169	110	173	110	147
		110	173	110	146
120	172	110	173	110	143
120	172	110	172	110	143
120	170	110	170	110	139
120	169	110	168	110	138
120	166	110	168	110	131
120	163	110	164	110	128
120	156	110	164	110	119
120	151	110	163		
120	150	110	162	100	179
		110	161	100	178
110	184	110	160	100	175
110	182	110	160	100	174
110	179	110	157	100	166
110	177	110	157	100	164
110	176	110	156	100	163
110	176	110	156	100	161
110	176	110	155	100	160
110	175	110	152	100	160

TABLE LVIII--Continued

Shorthand Dictation Rate	Shorthand Accuracy Index	Shorthand Dictation Rate	Shorthand Accuracy Index	Shorthand Dictation Rate	Shorthand Accuracy Index
100	156	90	134	70	103
100	153	90	132	70	98
100	150	90	129	70	88
100	149	90	125		
100	149	90	125	60	127
100	149	90	122	60	123
100	144	90	113	60	112
100	140	90	110	60	106
100	139	90	97	60	105
100	136			60	102
100	133	80	160	60	100
100	132	80	148	60	97
100	122	80	145	60	87
100	119	80	143	60	73
		80	136	60	59
90	171	80	132		
90	165	80	119	50	82
90	160			50	77
90	159	70	135	50	73
90	157	70	126	50	50
90	154	70	119	50	42
90	145	70	109	50	36
90	144	70	108	50	29
90	140	70	103		

TABLE LIX

SHORTHAND TRANSCRIPTION INDEX LISTED ACCORDING TO SHORTHAND ACCURACY INDEX

Shorthand Accuracy Index	Shorthand Transcription Index	Shorthand Accuracy Index	Shorthand Transcription Index	Shorthand Accuracy Index	Shorthand Transcription Index
186	190	172	190	160	191
184	191	172	190	160	187
182	193	172	187	160	185
180	196	171	194	160	186
180	193	170	193	160	165
179	191	170	187	159	171
179	185	169	186	157	185
178	188	169	184	157	184
177	192	168	189	157	178
176	193	168	177	156	189
176	192	166	185	156	184
176	191	166	184	156	182
175	194	165	182	156	176
175	193	164	188	155	179
175	188	164	179	154	176
174	191	164	174	153	184
174	191	163	187	152	184
174	189	163	180	151	156
174	183	163	179	150	191
173	189	162	184	150	184
173	186	161	187	150	181
173	184	161	174	149	186
173	179	160	192	149	168

TABLE LIX--Continued

Shorthand Accuracy Index	Shorthand Transcription Index	Shorthand Accuracy Index	Shorthand Transcription Index	Shorthand Accuracy Index	Shorthand Transcription Index
149	155	134	153	109	161
149	151	133	162	108	125
148	182	132	180	106	129
147	186	132	178	105	129
147	181	132	148	103	138
147	175	131	160	103	131
146	182	129	171	102	120
145	184	128	179	100	139
145	182	127	145	98	151
144	166	126	154	97	159
144	155	125	164	97	118
143	177	125	150	88	155
143	169	123	143	87	126
143	167	122	177	82	121
140	170	122	154	77	90
140	159	119	169	73	112
139	171	119	157	73	90
139	157	119	150	59	80
138	158	119	141	50	86
136	171	113	142	42	70
136	162	112	137	36	55
135	158	110	137	29	62

TABLE LX

SHORTHAND ACCURACY INDEX LISTED ACCORDING TO SHORTHAND TRANSCRIPTION INDEX

Shorthand Transcription Index	Shorthand Accuracy Index	Shorthand Transcription Index	Shorthand Accuracy Index	Shorthand Transcription Index	Shorthand Accuracy Index
196	180	189	168	184	157
194	175	189	156	184	156
194	171	188	178	184	153
193	182	188	175	184	152
193	180	188	164	184	150
193	176	187	172	184	145
193	175	187	170	183	174
193	170	187	163	182	165
192	177	187	161	182	156
192	176	187	160	182	148
192	160	186	173	182	146
191	184	186	169	182	145
191	179	186	160	181	150
191	176	186	160	181	147
191	174	186	149	180	163
191	174	186	147	180	132
191	160	185	179	179	173
191	150	185	166	179	164
190	186	185	157	179	163
190	172	184	173	179	155
190	172	184	169	179	128
189	174	184	166	178	157
189	173	184	162	178	132

TABLE LX--Continued

Shorthand Trancrip-tion Index	Shorthand Accuracy Index	Shorthand Transcrip-tion Index	Shorthand Accuracy Index	Shorthand Transcrip-tion Index	Shorthand Accuracy Index
177	168	161	109	142	113
177	143	160	131	141	119
177	122	159	140	139	100
176	156	159	97	138	103
176	154	158	138	137	112
175	147	158	135	137	110
174	164	157	139	131	103
174	161	157	119	129	106
171	159	156	151	129	105
171	139	155	149	126	87
171	136	155	144	125	108
171	129	155	88	121	82
170	140	154	126	120	102
169	143	154	122	118	97
169	119	153	134	112	73
168	149	151	149	90	77
167	143	151	98	90	73
166	144	150	125	86	50
165	160	150	119	80	59
164	125	148	132	70	42
162	136	145	127	62	29
162	133	143	123	55	36

TABLE LXI

SHORTHAND DICTATION RATE LISTED ACCORDING TO SHORTHAND TRANSCRIPTION INDEX

Shorthand Transcription Index	Shorthand Dictation Rate	Shorthand Transcription Index	Shorthand Dictation Rate	Shorthand Transcription Index	Shorthand Dictation Rate
196	130	189	110	184	110
194	110	189	110	184	110
194	90	188	110	184	100
193	130	188	100	184	100
193	130	188	100	184	90
193	110	187	120	184	90
193	110	187	120	183	110
193	110	187	110	182	120
192	110	187	110	182	110
192	110	187	100	182	90
192	80	186	130	182	80
191	110	186	110	182	80
191	110	186	110	181	110
191	110	186	100	181	100
191	110	186	100	180	100
191	110	186	100	180	90
191	110	185	120	179	120
191	100	185	110	179	110
190	110	185	100	179	110
190	110	184	120	179	110
190	110	184	120	179	100
189	110	184	110	178	110
189	110	184	110	178	80

TABLE LXI--Continued

Shorthand Transcription Index	Shorthand Dictation Rate	Shorthand Transcription Index	Shorthand Dictation Rate	Shorthand Transcription Index	Shorthand Dictation Rate
177	110	161	70	142	90
177	110	160	110	141	80
177	90	159	90	139	60
176	100	159	90	138	70
176	90	158	110	137	90
175	110	158	70	137	60
174	110	157	110	131	70
174	110	157	70	129	60
171	100	156	120	129	60
171	100	155	100	126	60
171	90	155	100	125	70
171	90	155	70	121	50
170	100	154	100	120	60
169	110	154	70	118	60
169	100	153	90	112	50
168	110	151	100	90	60
167	80	151	70	90	50
166	90	150	110	86	50
165	90	150	90	80	60
164	90	148	100	70	50
162	100	145	60	62	50
162	80	143	60	55	50

TABLE LXII

SHORTHAND TRANSCRIPTION INDEX LISTED ACCORDING TO SHORTHAND DICTATION RATE

Shorthand Dictation Rate	Shorthand Transcription Index	Shorthand Dictation Rate	Shorthand Transcription Index	Shorthand Dictation Rate	Shorthand Transcription Index
130	196	110	191	110	179
130	193	110	191	110	178
130	193	110	191	110	177
130	190	110	191	110	177
130	186	110	190	110	175
		110	189	110	174
120	190	110	189	110	174
120	187	110	189	110	169
120	187	110	189	110	168
120	185	110	188	110	160
120	184	110	187	110	158
120	184	110	187	110	157
120	182	110	186	110	150
120	179	110	186		
120	156	110	185	100	191
		110	184	100	188
110	194	110	184	100	188
110	193	110	184	100	187
110	193	110	184	100	186
110	193	110	183	100	186
110	192	110	182	100	186
110	192	110	181	100	185
110	191	110	179	100	184
110	191	110	179	100	184

TABLE LXII--Continued

Shorthand Dictation Rate	Shorthand Transcription Index	Shorthand Dictation Rate	Shorthand Transcription Index	Shorthand Dictation Rate	Shorthand Transcription Index
100	181	90	166	70	138
100	180	90	165	70	131
100	179	90	164	70	125
100	176	90	159		
100	171	90	159	60	145
100	171	90	153	60	143
100	170	90	150	60	139
100	169	90	142	60	137
100	162	90	137	60	129
100	155			60	129
100	155	80	192	60	126
100	154	80	182	60	120
100	151	80	182	60	118
100	148	80	178	60	90
		80	167	60	80
90	194	80	162		
90	184	80	141	50	121
90	184			50	112
90	182	70	161	50	90
90	180	70	158	50	86
90	177	70	157	50	70
90	176	70	155	50	62
90	171	70	154	50	55
90	171	70	151		

TABLE LXIII

SHORTHAND ACHIEVEMENT OF STUDENTS IN CONTROL CLASS A

Student	Dictation Rate		Accuracy Index		Transcription Index		I. Q.	
	Winter	Spring	Winter	Spring	Winter	Spring	Winter	Spring
1	60	*..	85	...	90	...	105	...
2	60	80	89	97	126	121	119	119
3	60	..	99	...	119	...	113	...
4	60	80	99	159	138	188	111	111
5	60	80	100	112	128	149	97	97
6	60	70	105	100	129	120	118	118
7	60	..	106	...	115	...	118	...
8	60	..	112	...	132	...	106	...
9	60	80	125	119	145	154	107	107
10	70	80	109	119	155	174	115	115
11	70	80	113	119	124	148	119	119
12	70	80	119	130	156	170	109	109
13	70	80	121	119	157	145	113	113
14	70	80	139	137	158	160	101	101
15	80	90	148	151	179	179	109	109
16	80	90	152	131	182	178	112	112
17	90	100	143	150	175	189	118	118
Mean	67.1	82.3	115.5	126.4	141.6	159.6	111.2	111.4

*...Students who did not complete the spring quarter.

TABLE LXIV

SHORTHAND ACHIEVEMENT OF STUDENTS IN CONTROL CLASS B

Student	Dictation Rate		Accuracy Index		Transcription Index		I. Q.	
	Winter	Spring	Winter	Spring	Winter	Spring	Winter	Spring
1	60	80	60	75	91	102	115	115
2	60	80	84	80	96	101	105	105
3	60	*..	90	...	109	...	118	...
4	60	70	102	103	132	130	112	112
5	60	..	106	...	130	...	119	...
6	60	70	109	112	129	139	129	129
7	60	70	112	99	124	112	119	119
8	60	80	113	115	127	150	119	119
9	60	..	124	...	148	...	112	...
10	70	90	105	112	139	150	113	113
11	70	70	108	112	118	129	121	121
12	70	80	120	127	152	154	121	121
13	70	80	127	130	164	171	119	119
14	80	90	147	152	182	189	103	103
15	80	90	160	169	190	191	117	117
Mean	65.3	79.2	111.1	115.5	135.4	143.2	116.1	116.1

*...Students who did not complete the spring quarter.

TABLE LXV

SHORTHAND ACHIEVEMENT OF STUDENTS IN EXPERIMENTAL CLASS A

Student	Dictation Rate		Accuracy Index		Transcription Index		I. Q.	
	Winter	Spring	Winter	Spring	Winter	Spring	Winter	Spring
1	60	*..	92	...	112	...	119	...
2	60	70	107	125	115	132	92	92
3	60	80	146	159	159	173	113	113
4	70	80	109	116	149	170	115	115
5	70	..	112	...	151	...	121	...
6	70	80	154	160	177	179	104	104
7	80	90	145	149	180	180	119	119
8	80	90	148	160	161	173	131	131
9	80	90	151	156	179	184	117	117
10	90	100	149	178	170	188	108	108
11	90	100	154	164	176	179	126	126
12	90	100	165	160	186	189	117	117
13	90	110	182	176	185	195	116	116
14	90	100	182	179	196	188	133	133
Mean	77.1	90.8	142.6	156.8	164	177.5	116.5	115.9

*...Students who did not complete the spring quarter.

TABLE LXVI

SHORTHAND ACHIEVEMENT OF STUDENTS IN EXPERIMENTAL CLASS B

Student	Dictation Rate		Accuracy Index		Transcription Index		I. Q.	
	Winter	Spring	Winter	Spring	Winter	Spring	Winter	Spring
1	60	*..	112	...	139	...	118	...
2	70	90	109	125	138	160	105	105
3	70	80	109	112	141	149	113	113
4	70	80	139	140	159	165	126	126
5	70	..	149	...	170	...	115	...
6	80	90	129	131	149	157	111	111
7	80	80	139	143	161	172	103	103
8	80	100	142	149	171	173	115	115
9	80	100	151	156	179	180	103	103
10	80	90	157	165	180	185	102	102
11	80	90	157	165	181	190	117	117
12	90	100	149	155	168	185	123	123
13	90	..	159	...	172	...	112	...
Mean	76.9	90	138.5	144.1	162.2	171.6	112.5	111.8

*...Students who did not complete the spring quarter.

TABLE LXVII

SHORTHAND DICTATION RATE, SHORTHAND ACCURACY INDEX, SHORTHAND TRANSCRIPTION INDEX, AND INTELLIGENCE QUOTIENT SCORE FOR THIRTY-TWO STUDENTS IN THE WINTER CONTROL GROUP

Dictation Rate	Accuracy Index	Transcription Index	IQ Score
90	143	175	118
80	160	190	117
80	152	182	112
80	148	179	109
80	147	182	103
70	139	158	101
70	127	164	119
70	121	157	113
70	120	152	121
70	119	156	109
70	113	124	119
70	109	155	115
70	108	118	121
70	105	139	113
60	125	145	107
60	124	148	112
60	113	127	119
60	112	132	106
60	112	124	119
60	109	129	129
60	106	130	119
60	106	115	118
60	105	129	118
60	102	132	112
60	100	129	97
60	99	138	111
60	99	119	113
60	90	109	118
60	89	126	119
60	85	90	105
60	84	96	105
60	60	91	115

TABLE LXVIII

SHORTHAND DICTATION RATE LISTED ACCORDING TO SHORTHAND ACCURACY INDEX FOR THIRTY-TWO STUDENTS IN THE WINTER CONTROL GROUP

Shorthand Accuracy Index	Shorthand Dictation Rate
160	80
152	80
148	80
147	80
143	90
139	70
127	70
125	60
124	60
121	70
120	70
119	70
113	70
113	60
112	60
112	60
109	70
109	60
108	70
106	60
106	60
105	70
105	60
102	60
100	60
99	60
99	60
90	60
89	60
85	60
84	60
60	60

TABLE LXIX

SHORTHAND ACCURACY INDEX LISTED ACCORDING TO SHORTHAND DICTATION RATE FOR THIRTY-TWO STUDENTS IN THE WINTER CONTROL GROUP

Shorthand Dictation Rate	Shorthand Accuracy Index
90	143
80	160
80	152
80	148
80	147
70	139
70	127
70	121
70	120
70	119
70	113
70	109
70	108
70	105
60	125
60	124
60	113
60	112
60	112
60	109
60	106
60	106
60	105
60	102
60	100
60	99
60	99
60	90
60	89
60	85
60	84
60	60

TABLE LXX

SHORTHAND TRANSCRIPTION INDEX LISTED ACCORDING TO SHORTHAND ACCURACY INDEX FOR THIRTY-TWO STUDENTS IN THE WINTER CONTROL GROUP

Shorthand Accuracy Index	Shorthand Transcription Index
160	190
152	182
148	179
147	182
143	175
139	158
125	145
124	148
127	164
121	157
120	152
119	156
113	127
113	124
112	132
112	124
109	155
109	129
108	118
106	130
106	115
105	139
105	129
102	132
100	129
99	138
99	119
90	109
89	126
85	90
84	96
60	91

TABLE LXXI

SHORTHAND ACCURACY INDEX LISTED ACCORDING TO SHORTHAND TRANSCRIPTION INDEX FOR THIRTY-TWO STUDENTS IN THE WINTER CONTROL GROUP

Shorthand Transcription Index	Shorthand Accuracy Index
190	160
182	152
182	147
179	148
175	143
164	127
158	139
157	121
156	119
155	109
152	120
148	124
145	125
139	105
138	99
132	112
132	102
130	106
129	109
129	105
129	100
127	113
126	89
124	113
124	112
119	99
118	108
115	106
109	90
96	84
91	60
90	85

TABLE LXXII

SHORTHAND DICTATION RATE LISTED ACCORDING TO SHORTHAND TRANSCRIPTION INDEX FOR THIRTY-TWO STUDENTS IN THE WINTER CONTROL GROUP

Shorthand Transcription Index	Shorthand Dictation Rate
190	80
182	80
182	80
179	80
175	90
164	70
158	70
157	70
156	70
155	70
152	70
148	60
145	60
139	70
138	60
132	60
132	60
130	60
129	60
129	60
129	60
127	60
126	60
124	70
124	60
119	60
118	70
115	60
109	60
96	60
91	60
90	60

TABLE LXXIII

SHORTHAND TRANSCRIPTION INDEX LISTED ACCORDING TO SHORTHAND DICTATION RATE FOR THIRTY-TWO STUDENTS IN THE WINTER CONTROL GROUP

Shorthand Dictation Rate	Shorthand Transcription Index
90	175
80	190
80	182
80	182
80	179
70	164
70	158
70	157
70	156
70	155
70	152
70	139
70	124
70	118
60	148
60	145
60	138
60	132
60	132
60	130
60	129
60	129
60	129
60	127
60	126
60	124
60	119
60	115
60	109
60	96
60	91
60	90

TABLE LXXIV

INTELLIGENCE QUOTIENT SCORE LISTED ACCORDING TO SHORTHAND ACCURACY INDEX FOR THIRTY-TWO STUDENTS IN THE WINTER CONTROL GROUP

Shorthand Accuracy Index	Intelligence Quotient Score
160	117
152	112
148	109
147	103
143	118
139	101
127	119
125	107
124	112
121	113
120	121
119	109
113	119
113	119
112	119
112	106
109	129
109	115
108	121
106	119
106	118
105	118
105	113
102	112
100	97
99	113
99	111
90	118
89	119
85	105
84	105
60	115

TABLE LXXV

SHORTHAND ACCURACY INDEX LISTED ACCORDING TO INTELLIGENCE QUOTIENT SCORE FOR THIRTY-TWO STUDENTS IN THE WINTER CONTROL GROUP

Intelligence Quotient Score	Shorthand Accuracy Index
129	109
121	120
121	108
119	127
119	113
119	113
119	112
119	106
119	89
118	143
118	106
118	105
118	90
117	160
115	109
115	60
113	121
113	105
113	99
112	152
112	124
112	102
111	99
109	148
109	119
107	125
106	112
105	85
105	84
103	147
101	139
97	100

TABLE LXXVI

INTELLIGENCE QUOTIENT SCORE LISTED ACCORDING TO SHORTHAND TRANSCRIPTION INDEX FOR THIRTY-TWO STUDENTS IN THE WINTER CONTROL GROUP

Shorthand Transcription Index	Intelligence Quotient Score
190	117
182	112
182	103
179	109
175	118
164	119
158	101
157	113
156	109
155	115
152	121
148	112
145	107
139	113
138	111
132	112
132	106
130	119
129	129
129	118
129	97
127	119
126	119
124	119
124	119
119	113
118	121
115	118
109	118
96	105
91	115
90	105

TABLE LXXVII

SHORTHAND TRANSCRIPTION INDEX LISTED ACCORDING TO INTELLIGENCE QUOTIENT SCORE FOR THIRTY-TWO STUDENTS IN THE WINTER CONTROL GROUP

Intelligence Quotient Score	Shorthand Transcription Index
129	129
121	152
121	118
119	164
119	130
119	127
119	126
119	124
119	124
118	175
118	129
118	115
118	109
117	190
115	155
115	91
113	157
113	139
113	119
112	182
112	148
112	132
111	138
109	179
109	156
107	145
106	132
105	96
105	90
103	182
101	158
97	129

TABLE LXXVIII

INTELLIGENCE QUOTIENT SCORE LISTED ACCORDING TO SHORTHAND DICTATION RATE FOR THIRTY-TWO STUDENTS IN THE WINTER CONTROL GROUP

Shorthand Dictation Rate	Intelligence Quotient Score
90	118
80	117
80	112
80	109
80	103
70	121
70	121
70	119
70	119
70	115
70	113
70	113
70	109
70	101
60	129
60	119
60	119
60	119
60	119
60	118
60	118
60	118
60	115
60	113
60	112
60	112
60	111
60	107
60	106
60	105
60	105
60	97

TABLE LXXIX

SHORTHAND DICTATION RATE LISTED ACCORDING TO INTELLIGENCE QUOTIENT SCORE FOR THIRTY-TWO STUDENTS IN THE WINTER CONTROL GROUP

Intelligence Quotient Score	Shorthand Dictation Rate
129	60
121	70
121	70
119	70
119	70
119	60
119	60
119	60
119	60
118	90
118	60
118	60
118	60
117	80
115	70
115	60
113	70
113	70
113	60
112	80
112	60
112	60
111	60
109	80
109	70
107	60
106	60
105	60
105	60
103	80
101	70
97	60

TABLE LXXX

SHORTHAND DICTATION RATE, SHORTHAND ACCURACY INDEX, SHORTHAND TRANSCRIPTION INDEX, AND INTELLIGENCE QUOTIENT SCORE FOR TWENTY-SEVEN STUDENTS IN THE WINTER EXPERIMENTAL GROUP

Dictation Rate	Accuracy Index	Transcription Index	IQ Score
90	182	196	133
90	182	185	116
90	165	186	117
90	159	172	112
90	154	176	126
90	149	170	108
90	149	168	123
80	157	181	117
80	157	180	102
80	151	179	117
80	151	179	103
80	148	161	131
80	145	180	119
80	142	171	115
80	139	161	103
80	129	149	111
70	154	177	104
70	149	170	115
70	139	159	126
70	112	151	121
70	109	149	115
70	109	141	113
70	109	138	105
60	146	159	113
60	112	139	118
60	107	115	92
60	92	112	119

TABLE LXXXI

SHORTHAND DICTATION RATE LISTED ACCORDING TO SHORTHAND ACCURACY INDEX FOR TWENTY-SEVEN STUDENTS IN THE WINTER EXPERIMENTAL GROUP

Shorthand Accuracy Index	Shorthand Dictation Rate
182	90
182	90
165	90
159	90
157	80
157	80
154	90
154	70
151	80
151	80
149	90
149	90
149	70
148	80
146	60
145	80
142	80
139	80
139	70
129	80
112	70
112	60
109	70
109	70
109	70
107	60
92	60

TABLE LXXXII

SHORTHAND ACCURACY INDEX LISTED ACCORDING TO SHORTHAND DICTATION RATE FOR TWENTY-SEVEN STUDENTS IN THE WINTER EXPERIMENTAL GROUP

Shorthand Dictation Rate	Shorthand Accuracy Index
90	182
90	182
90	165
90	159
90	154
90	149
90	149
80	157
80	157
80	151
80	151
80	148
80	145
80	142
80	139
80	129
70	154
70	149
70	139
70	112
70	109
70	109
70	109
60	146
60	112
60	107
60	92

TABLE LXXXIII

SHORTHAND TRANSCRIPTION INDEX LISTED ACCORDING TO SHORTHAND ACCURACY INDEX FOR TWENTY-SEVEN STUDENTS IN THE WINTER EXPERIMENTAL GROUP

Shorthand Accuracy Index	Shorthand Transcription Index
182	185
182	196
165	186
159	172
157	181
157	180
154	177
154	176
151	179
151	179
149	170
149	170
149	168
148	161
146	159
145	180
142	171
139	161
139	159
129	149
112	151
112	139
109	149
109	141
109	138
107	115
92	112

TABLE LXXXIV

SHORTHAND ACCURACY INDEX LISTED ACCORDING TO SHORTHAND TRANSCRIPTION INDEX FOR TWENTY-SEVEN STUDENTS IN THE WINTER EXPERIMENTAL GROUP

Shorthand Transcription Index	Shorthand Accuracy Index
196	182
186	165
185	182
181	157
180	157
180	145
179	151
179	151
177	154
176	154
172	159
171	142
170	149
170	149
168	149
161	148
161	139
159	146
159	139
151	112
149	129
149	109
141	109
139	112
138	109
115	107
112	92

TABLE LXXXV

SHORTHAND DICTATION RATE LISTED ACCORDING TO SHORTHAND TRANSCRIPTION INDEX FOR TWENTY-SEVEN STUDENTS IN THE WINTER EXPERIMENTAL GROUP

Shorthand Transcription Index	Shorthand Dictation Rate
196	90
186	90
185	90
181	80
180	80
180	80
179	80
179	80
177	70
176	90
172	90
171	80
170	90
170	70
168	90
161	80
161	80
159	60
159	70
151	70
149	80
149	70
141	70
139	60
138	70
115	60
112	60

TABLE LXXXVI

SHORTHAND TRANSCRIPTION INDEX LISTED ACCORDING TO SHORTHAND DICTATION RATE FOR TWENTY-SEVEN STUDENTS IN THE WINTER EXPERIMENTAL GROUP

Shorthand Dictation Rate	Shorthand Transcription Index
90	196
90	186
90	185
90	176
90	172
90	170
90	168
80	181
80	180
80	180
80	179
80	179
80	171
80	161
80	161
80	149
70	177
70	170
70	159
70	151
70	149
70	141
70	138
60	159
60	139
60	115
60	112

TABLE LXXXVII

INTELLIGENCE QUOTIENT SCORE LISTED ACCORDING TO SHORTHAND ACCURACY INDEX FOR TWENTY-SEVEN STUDENTS IN THE WINTER EXPERIMENTAL GROUP

Shorthand Accuracy Index	Intelligence Quotient Score
182	133
182	116
165	117
159	112
157	117
157	102
154	126
154	104
151	117
151	103
149	123
149	115
149	108
148	131
146	113
145	119
142	115
139	126
139	103
129	111
112	121
112	118
109	115
109	113
109	105
107	92
92	119

TABLE LXXXVIII

SHORTHAND ACCURACY INDEX LISTED ACCORDING TO INTELLIGENCE QUOTIENT SCORE FOR TWENTY-SEVEN STUDENTS IN THE WINTER EXPERIMENTAL GROUP

Intelligence Quotient Score	Shorthand Accuracy Index
133	182
131	148
126	154
126	139
123	149
121	112
119	145
118	112
117	165
117	157
117	151
116	182
115	149
115	142
115	109
113	146
113	109
119	92
112	159
111	129
108	149
105	109
104	154
103	151
103	139
102	157
92	107

TABLE LXXXIX

INTELLIGENCE QUOTIENT SCORE LISTED ACCORDING TO SHORTHAND TRANSCRIPTION INDEX FOR TWENTY-SEVEN STUDENTS IN THE WINTER EXPERIMENTAL GROUP

Shorthand Transcription Index	Intelligence Quotient Score
196	133
186	117
185	116
181	117
180	119
180	102
179	117
179	103
177	104
176	126
172	112
171	115
170	115
170	108
168	123
161	131
161	103
159	126
159	113
151	121
149	115
149	111
141	113
139	118
138	105
115	92
112	119

TABLE XC

SHORTHAND TRANSCRIPTION INDEX LISTED ACCORDING TO INTELLIGENCE QUOTIENT SCORE FOR TWENTY-SEVEN STUDENTS IN THE WINTER EXPERIMENTAL GROUP

Intelligence Quotient Score	Shorthand Transcription Index
133	196
131	161
126	171
126	159
123	168
121	151
119	180
119	112
118	139
117	186
117	181
117	179
116	185
115	171
115	170
115	149
113	159
113	141
112	172
111	149
108	170
105	138
104	177
103	179
103	161
102	180
92	115

TABLE XCI

INTELLIGENCE QUOTIENT SCORE LISTED ACCORDING TO SHORTHAND DICTATION RATE FOR TWENTY-SEVEN STUDENTS IN THE WINTER EXPERIMENTAL GROUP

Shorthand Dictation Rate	Intelligence Quotient Score
90	133
90	126
90	123
90	117
90	116
90	112
90	108
80	131
80	119
80	117
80	117
80	115
80	111
80	103
80	103
80	102
70	126
70	121
70	115
70	115
70	113
70	105
70	104
60	119
60	118
60	113
60	92

TABLE XCII

SHORTHAND DICTATION RATE LISTED ACCORDING TO INTELLIGENCE QUOTIENT SCORE FOR TWENTY-SEVEN STUDENTS IN THE WINTER EXPERIMENTAL GROUP

Intelligence Quotient Score	Shorthand Dictation Rate
133	90
131	80
126	90
126	70
123	90
121	70
119	80
119	60
118	60
117	90
117	80
117	80
116	90
115	80
115	70
115	70
113	70
113	60
112	90
111	80
108	90
105	70
104	70
103	80
103	80
102	80
92	60

TABLE XCIII

SHORTHAND DICTATION RATE, SHORTHAND ACCURACY INDEX, SHORTHAND TRANSCRIPTION INDEX, AND INTELLIGENCE QUOTIENT SCORE FOR TWENTY-FIVE STUDENTS IN THE SPRING CONTROL GROUP

Dictation Rate	Accuracy Index	Transcription Index	IQ Score
100	150	189	118
90	169	191	117
90	152	189	103
90	151	179	109
90	131	178	112
90	112	150	113
80	159	188	111
80	137	160	101
80	130	171	119
80	130	170	109
80	127	154	121
80	119	174	115
80	119	154	107
80	119	148	119
80	119	145	113
80	115	150	119
80	112	149	97
80	97	121	119
80	80	101	105
80	75	102	115
70	112	139	129
70	112	129	121
70	103	130	112
70	100	120	118
70	99	112	119

TABLE XCIV

SHORTHAND DICTATION RATE LISTED ACCORDING TO SHORTHAND ACCURACY INDEX FOR TWENTY-FIVE STUDENTS IN THE SPRING CONTROL GROUP

Shorthand Accuracy Index	Shorthand Dictation Rate
169	90
159	80
152	90
151	90
150	100
137	80
131	90
130	80
130	80
127	80
119	80
119	80
119	80
119	80
115	80
112	90
112	80
112	70
112	70
103	70
100	70
99	70
97	80
80	80
75	80

TABLE XCV

SHORTHAND ACCURACY INDEX LISTED ACCORDING TO SHORTHAND DICTATION RATE FOR TWENTY-FIVE STUDENTS IN THE SPRING CONTROL GROUP

Shorthand Dictation Rate	Shorthand Accuracy Index
100	150
90	169
90	152
90	151
90	131
90	112
80	159
80	137
80	130
80	130
80	127
80	119
80	119
80	119
80	119
80	119
80	115
80	112
80	97
80	80
80	75
70	112
70	103
70	100
70	99

TABLE XCVI

SHORTHAND TRANSCRIPTION INDEX LISTED ACCORDING TO SHORTHAND ACCURACY INDEX FOR TWENTY-FIVE STUDENTS IN THE SPRING CONTROL GROUP

Shorthand Accuracy Index	Shorthand Transcription Index
169	191
159	188
152	189
151	179
150	189
137	160
131	178
130	171
130	170
127	154
119	174
119	154
119	148
119	145
115	150
112	150
112	149
112	139
112	129
103	130
100	120
99	112
97	121
80	101
75	102

TABLE XCVII

SHORTHAND ACCURACY INDEX LISTED ACCORDING TO SHORTHAND TRANSCRIPTION INDEX FOR TWENTY-FIVE STUDENTS IN THE SPRING CONTROL GROUP

Shorthand Transcription Index	Shorthand Accuracy Index
191	169
189	152
189	150
188	159
179	151
178	131
174	119
171	130
170	130
160	137
154	127
154	119
150	115
150	112
149	112
148	119
145	119
139	112
130	103
129	112
121	97
120	100
112	99
102	75
101	80

TABLE XCVIII

SHORTHAND DICTATION RATE LISTED ACCORDING TO SHORTHAND TRANSCRIPTION INDEX FOR TWENTY-FIVE STUDENTS IN THE SPRING CONTROL GROUP

Shorthand Transcription Index	Shorthand Dictation Rate
191	90
189	90
189	100
188	80
179	90
178	90
174	80
171	80
170	80
160	80
154	80
154	80
150	90
150	80
149	80
148	80
145	80
139	70
130	70
129	70
121	80
120	70
112	70
102	80
101	80

TABLE XCIX

SHORTHAND TRANSCRIPTION INDEX LISTED ACCORDING TO SHORTHAND DICTATION RATE FOR TWENTY-FIVE STUDENTS IN THE SPRING CONTROL GROUP

Shorthand Dictation Rate	Shorthand Transcription Index
100	189
90	191
90	189
90	179
90	178
90	150
80	188
80	174
80	171
80	170
80	160
80	154
80	154
80	150
80	149
80	148
80	145
80	121
80	102
80	101
70	139
70	130
70	129
70	120
70	112

TABLE C

INTELLIGENCE QUOTIENT SCORE LISTED ACCORDING TO SHORTHAND ACCURACY INDEX FOR TWENTY-FIVE STUDENTS IN THE SPRING CONTROL GROUP

Shorthand Accuracy Index	Intelligence Quotient Score
169	117
159	111
152	103
151	109
150	118
137	101
131	112
130	119
130	109
127	121
119	115
119	107
119	119
119	113
115	119
112	113
112	97
112	129
112	121
103	112
100	118
99	119
97	119
80	105
75	115

TABLE CI

SHORTHAND ACCURACY INDEX LISTED ACCORDING TO INTELLIGENCE QUOTIENT SCORE FOR TWENTY-FIVE STUDENTS IN THE SPRING CONTROL GROUP

Intelligence Quotient Score	Shorthand Accuracy Index
129	112
121	127
121	112
119	130
119	119
119	115
119	99
119	97
118	150
118	[illegible]
117	169
115	119
115	75
113	119
113	112
112	131
112	103
111	153
109	151
109	130
107	119
105	80
103	152
101	137
97	112

TABLE CII

INTELLIGENCE QUOTIENT SCORE LISTED ACCORDING TO SHORTHAND TRANSCRIPTION INDEX FOR TWENTY-FIVE STUDENTS IN THE SPRING CONTROL GROUP

Shorthand Transcription Index	Intelligence Quotient Score
191	117
189	118
189	103
188	111
179	109
178	112
174	115
171	119
170	109
160	101
154	121
154	107
150	119
150	113
149	97
148	119
145	113
139	129
130	112
129	121
121	119
120	118
112	119
102	115
101	105

TABLE CIII

SHORTHAND TRANSCRIPTION INDEX LISTED ACCORDING TO INTELLIGENCE QUOTIENT SCORE FOR TWENTY-FIVE STUDENTS IN THE SPRING CONTROL GROUP

Intelligence Quotient Score	Shorthand Transcription Index
129	139
121	154
121	129
119	171
119	150
119	148
119	121
119	112
118	189
118	120
117	191
115	174
115	102
113	150
113	145
112	178
112	130
111	188
109	179
109	170
107	154
105	101
103	189
101	160
97	149

TABLE CIV

INTELLIGENCE QUOTIENT SCORE LISTED ACCORDING TO SHORTHAND DICTATION RATE FOR TWENTY-FIVE STUDENTS IN THE SPRING CONTROL GROUP

Shorthand Dictation Rate	Intelligence Quotient Score
100	118
90	117
90	113
90	112
90	109
90	103
80	121
80	119
80	119
80	119
80	119
80	115
80	115
80	113
80	111
80	109
80	107
80	105
80	101
80	97
70	129
70	121
70	119
70	118
70	112

TABLE CV

SHORTHAND DICTATION RATE LISTED ACCORDING TO INTELLIGENCE QUOTIENT SCORE FOR TWENTY-FIVE STUDENTS IN THE SPRING CONTROL GROUP

Intelligence Quotient Score	Shorthand Dictation Rate
129	70
121	80
121	70
119	80
119	80
119	80
119	80
119	70
118	100
118	70
117	90
115	80
115	80
113	90
113	80
112	90
112	70
111	80
109	90
109	80
107	80
105	80
103	90
101	80
97	80

TABLE CVI

SHORTHAND DICTATION RATE, SHORTHAND ACCURACY INDEX, SHORTHAND TRANSCRIPTION INDEX, AND INTELLIGENCE QUOTIENT SCORE FOR TWENTY-TWO STUDENTS IN THE SPRING EXPERIMENTAL GROUP

Dictation Rate	Accuracy Index	Transcription Index	IQ Score
110	176	195	116
100	179	188	133
100	178	188	108
100	164	179	126
100	160	189	117
100	156	180	103
100	155	185	123
100	149	173	115
90	165	190	117
90	165	185	102
90	160	173	131
90	156	184	117
90	149	180	119
90	131	157	111
90	125	160	105
80	160	179	104
80	159	173	113
80	143	172	103
80	140	165	126
80	116	170	115
80	112	149	113
70	125	132	92

TABLE CVII

SHORTHAND DICTATION RATE LISTED ACCORDING TO SHORTHAND ACCURACY INDEX FOR TWENTY-TWO STUDENTS IN THE SPRING EXPERIMENTAL GROUP

Shorthand Accuracy Index	Shorthand Dictation Rate
179	100
178	100
176	110
165	90
165	90
164	100
160	100
160	90
160	80
159	80
156	90
156	100
155	100
149	100
149	90
143	80
140	80
131	90
125	90
125	70
116	80
112	80

TABLE CVIII

SHORTHAND ACCURACY INDEX LISTED ACCORDING TO SHORTHAND DICTATION RATE FOR TWENTY-TWO STUDENTS IN THE SPRING EXPERIMENTAL GROUP

Shorthand Dictation Rate	Shorthand Accuracy Index
110	176
100	179
100	178
100	164
100	160
100	156
100	155
100	149
90	165
90	165
90	160
90	156
90	149
90	131
90	125
80	160
80	159
80	143
80	140
80	116
80	112
70	125

TABLE CIX

SHORTHAND TRANSCRIPTION INDEX LISTED ACCORDING TO SHORTHAND ACCURACY INDEX FOR TWENTY-TWO STUDENTS IN THE SPRING EXPERIMENTAL GROUP

Shorthand Accuracy Index	Shorthand Transcription Index
179	188
178	188
176	195
165	185
165	190
164	179
160	189
160	179
160	173
159	173
156	184
156	180
155	185
149	180
149	173
143	172
140	165
131	157
125	160
125	132
116	170
112	149

TABLE CX

SHORTHAND ACCURACY INDEX LISTED ACCORDING TO SHORTHAND TRANSCRIPTION INDEX FOR TWENTY-TWO STUDENTS IN THE SPRING EXPERIMENTAL GROUP

Shorthand Transcription Index	Shorthand Accuracy Index
195	176
190	165
189	160
188	179
188	178
185	165
185	155
184	156
180	156
180	149
179	164
179	160
173	160
173	159
173	149
172	143
170	116
165	140
160	125
157	131
149	112
132	125

TABLE CXI

SHORTHAND DICTATION RATE LISTED ACCORDING TO SHORTHAND TRANSCRIPTION INDEX FOR TWENTY-TWO STUDENTS IN THE SPRING EXPERIMENTAL GROUP

Shorthand Transcription Index	Shorthand Dictation Rate
195	110
190	90
189	100
188	100
188	100
185	90
185	100
184	90
180	100
180	90
179	100
179	80
173	90
173	80
173	100
172	80
170	80
165	80
160	90
157	90
149	80
132	70

TABLE CXII

SHORTHAND TRANSCRIPTION INDEX LISTED ACCORDING TO SHORTHAND DICTATION RATE FOR TWENTY-TWO STUDENTS IN THE SPRING EXPERIMENTAL GROUP

Shorthand Dictation Rate	Shorthand Transcription Index
110	195
100	189
100	189
100	188
100	185
100	180
100	179
100	173
90	190
90	185
90	184
90	180
90	173
90	160
90	157
80	179
80	173
80	172
80	170
80	165
80	149
70	132

TABLE CXIII

INTELLIGENCE QUOTIENT SCORE LISTED ACCORDING TO SHORTHAND ACCURACY INDEX FOR TWENTY-TWO STUDENTS IN THE SPRING EXPERIMENTAL GROUP

Shorthand Accuracy Index	Intelligence Quotient Score
179	133
179	108
176	116
165	117
165	102
164	126
160	131
160	117
160	104
159	113
156	117
156	103
155	123
149	119
149	115
143	103
140	126
131	111
125	105
125	92
116	115
112	113

TABLE CXIV

SHORTHAND ACCURACY INDEX LISTED ACCORDING TO INTELLIGENCE QUOTIENT SCORE FOR TWENTY-TWO STUDENTS IN THE SPRING EXPERIMENTAL GROUP

Intelligence Quotient Score	Shorthand Accuracy Index
133	179
126	160
126	164
126	140
123	155
119	149
117	165
117	160
117	156
116	176
115	149
115	116
113	112
113	159
111	131
108	178
105	125
104	160
103	156
103	143
102	165
92	125

5

TABLE CXV

INTELLIGENCE QUOTIENT SCORE LISTED ACCORDING TO SHORTHAND TRANSCRIPTION INDEX FOR TWENTY-TWO STUDENTS IN THE SPRING EXPERIMENTAL GROUP

Shorthand Transcription Index	Intelligence Quotient Score
195	116
190	117
189	117
188	133
188	108
185	123
185	102
184	117
180	119
180	103
179	126
179	104
173	131
173	115
173	113
172	103
170	115
165	126
160	105
157	111
149	113
132	92

TABLE CXVI

SHORTHAND TRANSCRIPTION INDEX LISTED ACCORDING TO INTELLIGENCE QUOTIENT SCORE FOR TWENTY-TWO STUDENTS IN THE SPRING EXPERIMENTAL GROUP

Intelligence Quotient Score	Shorthand Transcription Index
133	188
131	173
126	179
126	165
123	185
119	180
117	190
117	189
117	184
116	195
115	173
115	170
113	173
113	149
111	157
108	188
105	160
104	179
103	180
103	172
102	185
92	132

TABLE CXVII

INTELLIGENCE QUOTIENT SCORE LISTED ACCORDING TO SHORTHAND DICTATION RATE FOR TWENTY-TWO STUDENTS IN THE SPRING EXPERIMENTAL GROUP

Shorthand Dictation Rate	Intelligence Quotient Score
110	116
100	133
100	126
100	123
100	117
100	115
100	108
100	103
90	131
90	119
90	117
90	117
90	111
90	105
90	102
80	126
80	115
80	113
80	113
80	104
80	103
70	92

TABLE CXVIII

SHORTHAND DICTATION RATE LISTED ACCORDING TO INTELLIGENCE QUOTIENT SCORE FOR TWENTY-TWO STUDENTS IN THE SPRING EXPERIMENTAL GROUP

Intelligence Quotient Score	Shorthand Dictation Rate
133	100
131	90
126	100
126	80
123	100
119	90
117	100
117	90
117	90
116	110
115	100
115	80
113	80
113	80
111	90
108	100
105	90
104	80
103	100
103	80
102	90
92	70

APPENDIX B

Appendix B presents four of the word-list tests and examples of the dictation tests which were administered to the students.

SHORTHAND WORD-LIST TEST NUMBER ONE

1. two
2. tax
3. both
4. whether
5. required
6. open
7. car
8. bills
9. estate
10. bonus
11. data
12. liability
13. southwestern
14. yard
15. applied
16. cancellation
17. salaries
18. leaders
19. receipts
20. voucher
21. appointed
22. trim
23. rule
24. nine
25. fabric
26. announcing
27. policyholder
28. confirmation
29. protects
30. corrosion
31. nations
32. acre
33. fifteen
34. referendum
35. anybody
36. examined
37. obviously
38. track
39. classification
40. findings
41. misplaced
42. sat
43. accumulate
44. commence
45. enlisted
46. incidentally
47. optional
48. retire
49. trap
50. unmarried

51. they
52. best
53. supply
54. isssue
55. shipped
56. completed
57. receiving
58. known
59. similar
60. trouble
61. selected
62. collect
63. regardless
64. allowance
65. happen
66. grain
67. bought
68. priority
69. easier
70. employers
71. owner
72. machinery
73. inconvenience
74. degree
75. attempt
76. restricted
77. fun
78. advertise
79. livestock
80. affiliated
81. gratifying
82. speakers
83. correcting
84. nurses
85. thereafter
86. customers
87. intentions
88. seal
89. annuities
90. donation
91. joining
92. probability
93. supported
94. boom
95. dependability
96. gang
97. minded
98. protest
99. straighten
100. usage

101. or
102. attention
103. given
104. purchase
105. annual
106. sign
107. house
108. coverage
109. thing
110. sickness
111. financial
112. figure
113. advertising
114. institutions
115. merely
116. saving
117. produce
118. correspondence
119. yesterday
120. agencies
121. eliminate
122. dependable
123. column
124. arriving
125. stories
126. occasion
127. decline
128. sought
129. foot
130. tentative
131. ending
132. protecting
133. born
134. instruct
135. smile
136. claimed
137. governments
138. proposition
139. withdraw
140. currency
141. heating
142. patience
143. speaking
144. arrivals
145. cooperating
146. fate
147. knew
148. pie
149. shirts
150. visitors

151. sincerely
152. being
153. held
154. small
155. item
156. entire
157. her
158. minimum
159. top
160. valuable
161. kindest
162. style
163. corporation
164. knowledge
165. proud
166. resale
167. friendly
168. tried
169. institution
170. newspapers
171. slight
172. regularly
173. peak
174. inflation
175. contain
176. turned
177. joint
178. buff
179. passage
180. carbons
181. kilowatts
182. topics
183. doors
184. pianos
185. wardrobe
186. distinctive
187. managing
188. suits
189. birds
190. enjoyment
191. loaf
192. refinery
193. ventilators
194. chairmen
195. draw
196. handles
197. neon
198. refining
199. taste
200. utilized

SHORTHAND WORD-LIST TEST NUMBER TWO

1. if
2. possible
3. forward
4. association
5. reference
6. community
7. oil
8. interesting
9. automobile
10. treasurer
11. manufacturers
12. heard
13. carried
14. leave
15. plastic
16. stationery
17. quoted
18. engineers
19. background
20. authorization
21. executives
22. displays
23. consignee
24. automatic
25. surveys
26. pair
27. determining
28. substantially
29. fuel
30. thereto
31. equivalent
32. push
33. brochures
34. introduce
35. specialists
36. closest
37. gratitude
38. ran
39. wives
40. debit
41. highlight
42. pension
43. spots
44. assumption
45. countries
46. fighting
47. lapse
48. plow
49. shut
50. wallpaper

51. sales
52. prices
53. high
54. sale
55. promptly
56. visit
57. operating
58. route
59. add
60. stores
61. acknowledge
62. greatest
63. piece
64. road
65. wholesale
66. acting
67. parcel
68. graduate
69. prepare
70. registered
71. whereas
72. strength
73. reprint
74. mills
75. drivers
76. adding
77. mortgages
78. commodity
79. prescribed
80. congratulate
81. meat
82. yields
83. faced
84. quarts
85. acres
86. enabling
87. newly
88. threat
89. cement
90. facing
91. masters
92. reviewing
93. youth
94. clothing
95. emergencies
96. ill
97. officially
98. replacements
99. trace
100. unloading

101. do
102. month
103. total
104. convention
105. requirements
106. working
107. loss
108. handle
109. payments
110. simple
111. regard
112. choice
113. quick
114. ability
115. finance
116. desired
117. binding
118. party
119. driver
120. directed
121. nearest
122. lose
123. height
124. decrease
125. army
126. repaired
127. frequently
128. adopted
129. licenses
130. acquaint
131. gotten
132. slow
133. contributed
134. northwest
135. technique
136. criminal
137. inserted
138. scenic
139. anesthetic
140. divisional
141. intrastate
142. printer
143. suggests
144. bonding
145. demonstrating
146. futures
147. midwest
148. proportionally
149. stopping
150. winner

151. know
152. present
153. rates
154. administration
155. care
156. results
157. spring
158. amendment
159. distribution
160. chief
161. presented
162. brought
163. employe
164. papers
165. safety
166. society
167. independent
168. blind
169. liberal
170. par
171. starts
172. resulting
173. promise
174. inventories
175. debts
176. visiting
177. mailings
178. causes
179. pin
180. charter
181. leaflet
182. union
183. earn
184. posting
185. wording
186. drugs
187. medium
188. switch
189. boundaries
190. evidently
191. love
192. relaxed
193. visited
194. cherry
195. eager
196. hit
197. nonassessable
198. registry
199. termination
200. we

SHORTHAND WORD-LIST TEST NUMBER THREE

1. have
2. want
3. come
4. don't
5. hand
6. times
7. anything
8. answer
9. quite
10. ordered
11. accepted
12. chest
13. turn
14. fees
15. keeping
16. procedures
17. marked
18. blanks
19. typewriters
20. wrong
21. delayed
22. contributions
23. broad
24. accompany
25. shortages
26. meals
27. conservation
28. severe
29. explaining
30. steady
31. eggs
32. presentations
33. beneficiary
34. illustration
35. signs
36. catastrophe
37. garden
38. presence
39. wheels
40. coordinating
41. guilty
42. originating
43. slide
44. arches
45. container
46. faithful
47. judiciary
48. pens
49. seventeen
50. varsity

51. has
52. through
53. dealers
54. pleased
55. never
56. balance
57. asking
58. freight
59. otherwise
60. convenient
61. actually
62. rent
63. forces
64. pattern
65. weight
66. attention
67. tables
68. ground
69. cities
70. changing
71. instances
72. famous
73. demonstrate
74. churches
75. values
76. publicity
77. enjoyable
78. transcript
79. imposed
80. unfortunate
81. factor
82. restrictions
83. commanding
84. lieutenant
85. strategy
86. conducting
87. hurt
88. refills
89. addendum
90. desiring
91. impression
92. popularity
93. strict
94. backed
95. dark
96. forever
97. liquidation
98. preserve
99. southeastern
100. wherein

101. with
102. over
103. future
104. merchandise
105. investment
106. executive
107. giving
108. classes
109. samples
110. salary
111. considered
112. directory
113. wheat
114. grade
115. matters
116. requesting
117. nature
118. consequently
119. wide
120. advisory
121. drawn
122. cuts
123. closely
124. applicant
125. steps
126. noted
127. coupons
128. sort
129. featuring
130. systems
131. encouraging
132. propose
133. boost
134. initiative
135. smallest
136. Christian
137. girl
138. proposals
139. winners
140. crude
141. heater
142. parity
143. solved
144. array
145. cool
146. fatalities
147. kitchen
148. picking
149. ships
150. virtually

151. to
152. price
153. then
154. matter
155. current
156. remember
157. states
158. transportation
159. provisions
160. words
161. half
162. payroll
163. private
164. attaching
165. comments
166. doctor
167. eastern
168. thirty
169. replying
170. taxable
171. avoid
172. bear
173. adjusters
174. storm
175. pressure
176. imperative
177. bus
178. proves
179. deliveries
180. risks
181. deeply
182. outlook
183. angle
184. gather
185. riding
186. beaver
187. farmer
188. pastures
189. unfair
190. compartment
191. functions
192. nearby
193. sew
194. afforded
195. conclude
196. exceeded
197. inked
198. owns
199. rolling
200. universal

SHORTHAND WORD-LIST TEST NUMBER FOUR

1. at
2. before
3. report
4. think
5. little
6. ten
7. idea
8. different
9. trip
10. sickness
11. instead
12. got
13. attendance
14. lb.
15. moving
16. shares
17. provision
18. distributed
19. apparently
20. amendments
21. entering
22. designated
23. competitive
24. associates
25. supplied
26. OPS
27. demonstrated
28. stating
29. franchise
30. theater
31. English
32. publish
33. boys'
34. intention
35. solid
36. closes
37. graduation
38. pursue
39. withdrawn
40. damaging
41. hereafter
42. pen
43. spiritual
44. assignments
45. countersigned
46. fault
47. lady
48. playing
49. shot
50. voice

51. this
52. find
53. money
54. rate
55. address
56. said
57. schedule
58. save
59. higher
60. groups
61. seeing
62. American
63. sufficient
64. duplicate
65. holding
66. notify
67. laws
68. beyond
69. trained
70. winter
71. constructive
72. comply
73. became
74. whatsoever
75. seek
76. locations
77. complied
78. self
79. estimates
80. specifically
81. diversion
82. pool
83. bath
84. idealism
85. shipper
86. cancer
87. fruit
88. precedence
89. votes
90. continuation
91. governor
92. offerings
93. sketch
94. apart
95. construct
96. extensions
97. itemized
98. pecan
99. selecting
100. USP

101. for
102. first
103. interested
104. less
105. recent
106. forms
107. campaign
108. commission
109. treasury
110. colors
111. nothing
112. traffic
113. remittance
114. cars
115. detail
116. load
117. goes
118. wiring
119. simply
120. towns
121. chamber
122. buyer
123. appointment
124. transmission
125. reduce
126. junior
127. chart
128. reminder
129. economical
130. settlement
131. describes
132. perfect
133. arm
134. happiness
135. scope
136. bright
137. fluid
138. piano
139. values
140. confirming
141. garage
142. ninety
143. shoot
144. alive
145. confronted
146. expand
147. instantly
148. paragraphs
149. sand
150. unsurpassed

151. department
152. let
153. delivery
154. assistant
155. needed
156. man
157. written
158. vote
159. determine
160. assist
161. damage
162. join
163. reasons
164. test
165. appeal
166. binder
167. refund
168. leaders
169. putting
170. uses
171. appearance
172. treated
173. rug
174. neither
175. expanding
176. ample
177. plate
178. comprehensive
179. proportion
180. correction
181. multiple
182. acre
183. fifteen
184. redemption
185. animal
186. evident
187. numbering
188. tower
189. classification
190. fillers
191. minister
192. salvage
193. accounted
194. combat
195. enjoying
196. incident
197. optimistic
198. responses
199. tragic
200. winning

DICTATION TEST AT 60 WORDS A MINUTE FOR THREE MINUTES

Dear John: This is not an easy letter for me to write; but in fairness to you, I must write it. Yesterday I received an analysis of the sales of every salesman in our division, starting from the first year of his employment. If you could see your own chart, I think you would be surprised.

Your sales volume has not dropped sharply in recent years, and your commissions are still running better than $600 a month. Your sales curve, however, is dropping; and the decline began four years ago, at which time you were the top salesman in our division.

I know that a good salesman doesn't bother too much with figures. Consequently, you may not have realized that in each of the last four years your monthly average has been a little less than the year before.

This would not worry me if you were an old man; but you are only forty-four, with another twenty years of selling ahead of you. In other words, you cannot afford to let your income decrease from year to year--and the time to reverse the direction is now, while you are still making good money. Sincerely yours,

DICTATION TEST AT 90 WORDS A MINUTE FOR THREE MINUTES

Dear Friend: Are you getting the most out of your leisure time? Are you satisfied with the way in which you are spending the few spare moments that are at your disposal? If you are not profiting by your leisure, but would like to do so, then I am sure that this letter will interest you.

If we are frank with ourselves, we must sooner or later admit that we waste a great deal of time. Of course, a few of us believe that we must be doing something worth while every moment of our waking hours. If we are honest with ourselves, however, we will all admit that we could put our spare time to much better use.

The reason for this is that, for most of us, the greater part of our day is planned. We get up in the morning and dress; our work at the office is cut out for us. We may vary the routine a little from day to day, but we do not vary it very much.

Our spare time, however, seldom is planned at all. Haven't you many times whished for something more worth while to do in your spare time? Haven't you often wished for a plan that would make your leisure hours more interesting and profitable?

Most of us realize that good reading is the practical way to make the best use of our spare hours. The average person, however, can hardly be expected to know how to choose the best in books. When it takes a scholar a lifetime to find even a few of the best stories and essays, how can the busy man or woman hope to discover just the right reading in the little time available? Cordially,

DICTATION TEST AT 120 WORDS A MINUTE FOR THREE MINUTES

Dear Sir: Please read the enclosed bulleting as soon as possible. It explains an unusual offer to former Book Club members. It is your chance to get the two most thrilling novels of the season free if you rejoin the Club. Be sure to read the description of both these books in the enclosed bulletin.

Right now these books are being read and enjoyed by thousands of men and women. These readers are paying $3 for each of these books in the regular editions. The Book Club, however, wants to give you both these books to prove to you that the books that Club members are getting are now better than ever.

As you remember, the Book Club enables you to buy your choice of the finest new books at a saving of over 60 per cent of the regular retail price. What is more, on this special offer to former members, we will guarantee this saving for a full year despite increasing paper and printing costs. If you rejoin the Club now, you may have your pick of our fine books at the special price of only $1 each plus a small shipping charge. What is more, you enjoy all your former advantages of membership without paying any dues; and you need purchase no more than six books during a whole year.

The operation of the Club is simple. As soon as we receive your enrollment, we will send you your free membership gifts and put you on the subscription list to receive free every month a copy of our bulletin. This delightful little booklet describes in detail the Club's next selections. In addition, the monthly bulletin now gives you entertaining reviews of a large number of other books that are available to members for only \$1 each. All these books are selling at retail in the regular editions for two and three times this amount.

If you do not want either or both of these selections, all you need do is notify us, and the books will not be sent. On the other hand, if you want any number of the other books reviewed, you can have them at the same low price of only \$1 each. Very cordially yours, DICTATION TEST AT 80 WORDS A MINUTE FOR FIVE MINUTES

Dear Friend: How would you like to receive immediately a copy of a book that has been sold to the movies for more than $100,000 even before it has been published? The Book Club has received an exclusive printing of this book that we are certain will soon become a best seller. The name of the book is "The Romance of the West." A copy of this book will be sent to you immediately without charge, when you sign and return the enclosed application to America's best-known book club.

A membership in the Book Club will definitely save you money on your book purchases. Unlike other similar organizations, the Book Club never charges its members more than $2 for the books that are selected. The same books are always on sale in the regular edition for as much as $5. You can judge for yourself how worth while a membership in the Book Club will be.

Furthermore, you need accept only four books a year--not one every month, as many people think. Membership includes a monthly copy of the Book Club's interesting magazine. The magazine tells you, in advance, about the books that are to be offered by the club. Thus, you may decide beforehand whether or not you think the book will appeal to you. If you feel you don't want the book, simply notify us to this effect; and the book will not be sent.

There is still another way in which the members of the Book Club benefit. After each four books that you purchase, you will receive, free of charge, a book bonus. Like the regular monthly books, these book bonuses are also popular books that you will enjoy reading. These books often sell at $5 or more in the original publisher's edition.

We have a special reason for urging you to accept our invitation to join at once. If you join now, we can definitely assure you that there will be no increase in the book bonus selections for at least one year. Furthermore, there will be no membership fee or extra charges of any kind. You will pay for only the selections you decide to purchase, and these purchases will cost you no more than $2 plus postage charges. Fill in the form that is enclosed, and mail it to us at once. Yours truly,